

# **AMI Configuration Commands Reference Manual**

Part 1

MANU0265-03 - Rev. A - 5/14/98

Software Version 5.2.x

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#### FCC CLASS A NOTICE

**WARNING**: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void this user's authority to operate this equipment.

NOTE: The ASX-200WG, the ASX-200BX, the ASX-1000, and the *ForeRunnerLE* 155 have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### DOC CLASS A NOTICE

This digital apparatus does not exceed Class A limits for radio noise emission for a digital device as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

#### VCCI CLASS 1 NOTICE

この装置は、第一種情報処理装置(商工業地域において使用されるべき情報処理装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

This equipment is in the Class 1 category (Information Technology Equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Information Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.

### FCC REQUIREMENTS (Notice to Users of DS1 Service)

The following instructions are provided to ensure compliance with the Federal Communications Commission (FCC) Rules, Part 68.

- This device must only be connected to the DS1 network connected behind an FCC Part 68 registered channel service unit. Direct connection is not allowed.
- (2) Before connecting your unit, you must inform the telephone company of the following information:

Port ID	REN/SOC	FIC	USOC
NM-6/DS1C	6.0N	04DU9-BN,	RJ48C
NM-2/DS1C		04DU9-DN,	
NM-8/DS1D		04DU9-1ZN, and	
NM-4/DS1D		04DU9-1SN	

- (3) If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if your equipment or the telephone line is the source of the trouble. If your equipment needs repair, it should not be reconnected until it is repaired.
- (4) If the telephone company finds that this equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give you advance notice if possible.
- (5) Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.
- (6) If the telephone company alters their equipment in a manner that will affect use of this device, they must give you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.

#### CANADIAN IC CS-03 COMPLIANCE STATEMENT

<u>NOTICE</u>: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local tele-communications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

<u>Caution</u>: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

#### F1 AND E3 NOTICE

The E1 (NM-6/E1C, NM-2/E1C, NM-8/E1D, and NM-4/E1D) and E3 (NM-4/E3C, NM-2/E3C, NM-4/E3D, and NM-2/E3D) network modules that are described in this manual are approved for use in FORE Systems' host systems providing that the instructions below are strictly observed. Failure to follow these instructions invalidates the approval.

#### Pan European Approval - CE Marking

Pan European approval of the E1 network module was issued by BABT following assessment against CTR12. This means that it can be connected to ONP and unstructured PTO-provided private circuits with 120  $\Omega$  interfaces in all European countries, according to Telecommunications Terminal Equipment (TTE) Directive 91/263/EEC. Thus, the following CE mark applies:

# **C€168.X**

The E1 and E3 network modules conform to safety standard EN60950: 1992 following the provisions of Low Voltage Product Safety Directive 73/23/EEC and CE Marking Directive 93/68/EEC, and can be marked accordingly with the CE symbol.

The E1 and E3 network modules conform to EN55022: 1994 and EN50082-1: 1992 following the provisions of the EMC Directive 89/336/EEC, and can be marked accordingly with the CE symbol.

#### **National Approvals**

#### UK

Network Module	Connects to	Approval Number
E1	PTO-provided private circuits with 75 Ω interfaces	AA60953
E3	PTO-provided private circuits with 75 $\Omega$ interfaces	NS/4387/1/T/605954
CEM E1	PTO-provided private circuits with 75 $\Omega$ or 120 $\Omega$ unstructured interfaces	AA607478

#### Required User Guide Statements - UK Installation

The network modules are designed for use only with FORE Systems ATM Switches. Use of the network modules in any product not listed in this manual may result in a hazard and will invalidate the regulatory approval. The network modules must be installed in accordance with the installation instructions provided.

The following table shows the available ports and their safety status:

Ports	Safety Status
E1 and E3 Ports	TNV operating at SELV
Bus Connector	SELV

#### **CE** NOTICE

Marking by the symbol **CE** indicates compliance of this system to the EMC (Electromagnetic Compatibility) directive of the European Community and compliance to the Low Voltage (Safety) Directive. Such marking is indicative that this system meets or exceeds the following technical standards:

- EN 55022 "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."
- EN 50082-1 "Electromagnetic compatibility Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC 1000-4-2 "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements."
- IEC 1000-4-3 "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiate electromagnetic field requirements."
- IEC 1000-4-4 "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements."

#### SAFETY CERTIFICATIONS

ETL certified to meet Information Technology Equipment safety standards UL 1950, CSA 22.2 No. 950, and EN 60950.

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### **Preface**

This manual provides the technical information needed to configure the ATM Management Interface (AMI) for the *ForeRunner*<sup>TM</sup> family of ATM Switches, TNX ATM Switches, and *ForeRunnerLE* Switches. This document was created for users with various levels of experience. If you have any questions or problems, please contact FORE Systems' Technical Support.

# **Chapter Summaries**

**Chapter 1 - AMI Configuration Commands** - Contains a text and graphical description of the configuration level AMI commands and menus. Describes the commands and menus from configuration alarms> to configuration nsap>.

### **Related Manuals**

AMI Configuration Command Reference Manual, Part 2 - Describes the configuration level AMI commands and menus from configuration port> to configuration vpt>.

ATM Management Interface (AMI) Manual - Describes the root, display, operation, and statistics level AMI commands and menus.

ATM Switch Diagnostics and Troubleshooting Manual - Describes the debug level AMI commands and menus. Also, describes error messages, loopbacks, SCP diagnostics, and ATM Forum PNNI debugging information.

# **Technical Support**

In the U.S.A., customers can reach FORE Systems' Technical Assistance Center (TAC) using any one of the following methods:

1. Select the "Support" link from FORE's World Wide Web page:

http://www.fore.com/

2. Send questions, via e-mail, to:

support@fore.com

3. Telephone questions to "support" at:

800-671-FORE (3673) or 724-742-6999

4. FAX questions to "support" at:

724-742-7900

Technical support for customers outside the United States should be handled through the local distributor or via telephone at the following number:

+1 724-742-6999

No matter which method is used to reach FORE Support, customers should be ready to provide the following:

- A support contract ID number
- The serial number of each product in question
- All relevant information describing the problem or question

# **Typographical Styles**

Throughout this manual, all specific commands meant to be entered by the user appear on a separate line in bold typeface. In addition, use of the Enter or Return key is represented as <ENTER>. The following example demonstrates this convention:

#### cd /usr <ENTER>

File names that appear within the text of this manual are represented in the following style: "...the fore\_install program installs this distribution."

Command names that appear within the text of this manual are represented in the following style: "...using the flush-cache command clears the bridge cache."

Subsystem names that appear within the text of this manual are represented in the following style: "...to access the bridge subsystem..."

Parameter names that appear within the text of this manual are represented in the following style: "...using  $\langle seg-list \rangle$  allows you to specify the segments for which you want to display the specified bridge statistics."

Any messages that appear on the screen during software installation and network interface administration are shown in Courier font to distinguish them from the rest of the text as follows:

.... Are all four conditions true?

### **Important Information Indicators**

To call your attention to safety and otherwise important information that must be reviewed to ensure correct and complete installation, as well as to avoid damage to the FORE Systems product or to your system, FORE Systems utilizes the following *WARNING/CAUTION/NOTE* indicators.

**WARNING** statements contain information that is critical to the safety of the operator and/or the system. Do not proceed beyond a **WARNING** statement until the indicated conditions are fully understood or met. This information could prevent serious injury to the operator, damage to the FORE Systems product, the system, or currently loaded software, and is indicated as follows:

#### **WARNING!**



Hazardous voltages are present. To reduce the risk of electrical shock and danger to personal health, follow the instructions carefully.

**CAUTION** statements contain information that is important for proper installation/operation. Compliance with **CAUTION** statements can prevent possible equipment damage and/or loss of data and are indicated as follows:

#### CAUTION



You risk damaging your equipment and/or software if you do not follow these instructions.

**NOTE** statements contain information that has been found important enough to be called to the special attention of the operator and is set off from the text as follows:



If you change the value of the LECS control parameters while the LECS process is running, the new values do not take effect until the LECS process is stopped, and then restarted.

### **Invisible Laser Radiation Notice**

Class 1 Laser Product: This product conforms to applicable requirements of 21 CFR 1040 at the date of manufacture.

Class 1 lasers are defined as products which do not permit human access to laser radiation in excess of the accessible limits of Class 1 for applicable wavelengths and durations. These lasers are safe under reasonably foreseeable conditions of operation. Do not view beam with optical instruments.

Single mode fiber optic network modules contain a Class 1 laser.



This Laser Notice section only applies to products or components containing Class 1 lasers.

# **Safety Precautions**

For your protection, observe the following safety precautions when setting up equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous
  voltages may be present. Conductive foreign objects could produce a short circuit
  that could cause fire, electric shock, or damage to your equipment.

### **Modifications to Equipment**

Do not make mechanical or electrical modifications to the equipment. FORE Systems, Inc., is not responsible for regulatory compliance of a modified FORE product.

# **AMI Configuration Commands**

This chapter contains a detailed description of the AMI configuration commands. The main configuration menu can be found at the root level. There are several commands available under configuration. Commands that are submenus are immediately followed by a ">" symbol. Typing configuration? at the prompt at the root level displays the configuration commands as follows:

myswitch::> conf:	iguration ?		
alarms>	atmarp>	atmroute>	board>
cec>	ces>	fratm>	funi>
ilmiproxy>	ip>	lane>	module>
nsap>	port>	profile>	qos>
qosext>	rs232>	security>	snmp>
spans>	spvc>	switch>	system>
timing>	signalling>	upc>	VCC>
vnc>	vnt>		

Each of these commands has a submenu of commands. This manual describes the commands and menus from configuration alarms> to configuration nsap>. Please see Part 2 of the AMI Configuration Commands Reference Manual for descriptions of the commands and menus from configuration port> to configuration vpt>.

# 1.1 Alarms Configuration Commands

This submenu allows you to configure alarms. You can display the list of available subcommands by typing alarms? at the configuration level.

```
myswitch::configuration> alarms ?
  show         enable         disable         reset
module>
```

### 1.1.1 Displaying Alarm Conditions

This command lets you display the status of all alarms. The linkFailed, spansFailed, netmodRemovedHighPrio, and netmodRemovedLowPrio alarms are available on all switches. The powerSupplyInputFailed and tempSensorOverTemp alarms are available on all switches, except an LE 155. The powerSupplyOutputFailed alarm is only available on an ASX-200BX, an ASX-1000, a TNX-210, and a TNX-1100. The fanBankFailed alarm is only available on an ASX-1000 and a TNX-1100. The powerSupplyOverCurrent and powerSupply5VoltFailed alarms are only available on a DC-powered ASX-1000 and TNX-1100. Enter the following parameters:

myswitch::configuration alar	ms> <b>show</b>		
AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	inactive	disabled	enabled
powerSupplyOutputFailed	inactive	disabled	enabled
fanBankFailed	inactive	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
linkFailed	inactive	enabled	disabled
spansFailed	inactive	enabled	disabled
powerSupplyOverCurrent	inactive	disabled	enabled
powerSupply5VoltFailed	inactive	disabled	enabled
netmodRemovedHighPrio	inactive	disabled	disabled
netmodRemovedLowPrio	inactive	disabled	disabled
Major alarm relay status: of	f		
Minor alarm relay status: of	f		

Field	Description
AlarmType	The name of the alarm.
AlarmStatus	Shows if the state of the alarm is active (alarming) or inactive (not alarming). An alarm is active if the underlying condition is detected. For power supplies, the input failed alarm condition is active if the input voltage is not within the nominal range for the supply. This does not necessarily mean that an output failure will result. A power supply output failure condition is active if any power supply is failing or if it is physically removed.
MinorAlarm	disabled means that this alarm type will not cause a minor alarm. enabled means that this alarm type will cause a minor alarm.
MajorAlarm	disabled means that this alarm type will not cause a major alarm. enabled means that this alarm type will cause a major alarm.
Major alarm relay status	off means no major alarms are currently active. on means one or more major alarms are currently active. Look at the AlarmStatus field to see which condition is in a state of alarm.
Minor alarm relay status	off means no minor alarms are currently active. on means one or more minor alarms are currently active. Look at the AlarmStatus field to see which condition is in a state of alarm.

### 1.1.2 Enabling an Alarm

This command lets you enable an alarm. Enter the following parameters:

```
myswitch::configuration alarms> enable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major	Indicates that the designated alarm type causes a major alarm when that condition occurs.
minor	Indicates that the designated alarm type causes a minor alarm when that condition occurs.
alarm type	Indicates the kind of alarm condition. Valid alarm types are displayed in the AlarmType field for conf alarms show.

For example, to enable an overtemperature condition that is detected by the overtemperature sensor as a major alarm, enter the following parameters:

```
myswitch::configuration alarms> enable major tempSensorOverTemp
```

To verify that the change has taken effect, you can display the alarms:

myswitch::configuration alarms	> show		
AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	inactive	disabled	enabled
powerSupplyOutputFailed	inactive	disabled	enabled
fanBankFailed	inactive	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
linkFailed	inactive	enabled	disabled
spansFailed	inactive	enabled	disabled
netmodRemovedHighPrio	inactive	disabled	disabled
netmodRemovedLowPrio	inactive	disabled	disabled
Major alarm relay status: off			

Minor alarm relay status: off

### 1.1.3 Disabling an Alarm

This command lets you disable an alarm. Enter the following parameters:

```
myswitch::configuration alarms> disable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major	Indicates that a major alarm is being disabled.
minor	Indicates that a minor alarm is being disabled.
alarm type	Indicates the kind of alarm condition. Valid alarm types are displayed in the AlarmType field for conf alarms show.

For example, to disable a link failure as a minor alarm, enter the following parameters:

```
myswitch::configuration alarms> disable minor linkFailed
```

To verify that the change has taken effect, you can display the alarms:

myswitch::configuration alarms> show

AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	inactive	disabled	enabled
powerSupplyOutputFailed	inactive	disabled	enabled
fanBankFailed	inactive	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
linkFailed	inactive	disabled	enabled
spansFailed	inactive	enabled	disabled
netmodRemovedHighPrio	inactive	disabled	disabled
netmodRemovedLowPrio	inactive	disabled	disabled

Major alarm relay status: off Minor alarm relay status: off

### 1.1.4 Resetting an Alarm

This command lets you reset either the linkFailed alarm, the spansFailed alarm, or both alarms. Enter the following parameters:

```
myswitch::configuration alarms> reset (<alarm type> | all)
```

These parameters are defined as follows:

Parameter	Description
alarm type	Indicates which alarm to reset. Can be either linkFailed or spansFailed.
all	Indicates that both the linkFailed and the spansFailed alarms will be reset.

For example, to reset the linkFailed alarm, enter the following parameters:

```
myswitch::configuration alarms> reset linkFailed
Alarm linkFailed reset.
```

To verify that the change has taken effect, you can display the alarms:

myswitch::configuration alarms> <b>show</b>			
AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	inactive	disabled	enabled
powerSupplyOutputFailed	inactive	disabled	enabled
fanBankFailed	inactive	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
linkFailed	inactive	enabled	disabled
spansFailed	active	enabled	disabled
netmodRemovedHighPrio	inactive	disabled	disabled
netmodRemovedLowPrio	inactive	disabled	disabled
Major alarm relay status: off			

Major alarm relay status: off Minor alarm relay status: on

### 1.1.5 Network Module Alarm Commands

These commands, used in conjunction with the conf alarm enable and disable commands, allow you to configure alarms that notify you of the physical removal of a network module from a particular slot in the switch fabric. You can display the list of available subcommands by typing module? at the alarms level.

### 1.1.5.1 Displaying the Network Module Alarm Configuration

This command lets you display the current configuration of the network module alarms. Enter the following parameters:

myswitch::con	ıfiguration al	arms module> <b>show</b>
NetmodSlot	NetmodPrio	NetmodStatus
A	none	present
В	high	present
C	low	present
D	none	absent

Field	Description
NetmodSlot	The network module slot in the switch fabric.
NetmodPrio	The priority assigned to this slot. Can be none, high, or low high means that the netmodRemovedHighPrio alarm is activated when a network module is removed from that slot. low means that the netmodRemovedLowPrio alarm is activated when a network module is removed from that slot. none means that no alarm is activated when a network module is removed from that slot. The default is none.
NetmodStatus	Shows present or absent depending on whether or not a network module is currently installed in that slot.

### 1.1.5.2 Configuring Network Module Alarm Priorities

This command lets you configure priorities for the network module alarms for each slot in the switch fabric. There are four slots labeled A, B, C, and D. These alarms alert you when a network module has been removed from that slot. Enter the following parameters:

myswitch::configuration alarms module> assign <slot> <pri><priority>

These parameters are defined as follows:

Parameter	Description
slot	The slot in the switch fabric for which you want to configure an alarm priority. Can be ${\tt A}, {\tt B}, {\tt C},$ or ${\tt D}.$
priority	The priority you want to assign to the slot. Each slot in the fabric may be assigned a different priority: high, low, or none. high means that the netmodRemovedHighPrio alarm is activated when a network module is removed from that slot. low means that the netmodRemovedLowPrio alarm is activated when a network module is removed from that slot. none means that no alarm is activated when a network module is removed from that slot. The default is none.

For example, to configure slot D with a high priority, enter:

myswitch::configuration alarms module > assign D high

This assigns a high priority to slot D. Then you need to decide if you want the high priority to be a major or minor alarm (the major and minor alarms for network module removal are disabled by default), and enable it as such, as follows:

myswitch::configuration alarms> enable major netmodRemovedHighPrio

This makes the high priority a major alarm. If a network module is then removed from slot D, the NetmodStatus field shows absent as follows:

myswitch::configuration alarms module> show					
NetmodSlot	NetmodPrio	NetmodStatus			
A	none	present			
В	none	present			
C	low	present			
D	high	absent			

### AMI Configuration Commands

Also, the AlarmStatus for netmodRemovedHighPrio is active and the Major alarm relay status is on as follows:

myswitch::configuration alarm	s> <b>show</b>		
AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	inactive	disabled	enabled
powerSupplyOutputFailed	inactive	disabled	enabled
fanBankFailed	inactive	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
linkFailed	inactive	enabled	disabled
spansFailed	inactive	enabled	disabled
${\tt netmodRemovedHighPrio}$	active	disabled	enabled
netmodRemovedLowPrio	inactive	enabled	disabled

Major alarm relay status: on Minor alarm relay status: off

# 1.2 ATM ARP Configuration Commands

These commands allow you to manage the ATM ARP (address resolution protocol) features. You can display the list of available subcommands by typing? at the atmarp level.

### 1.2.1 ARP Server Configuration Commands

These commands let you configure the RFC-1577 ATM ARP server. You can get to this level by entering arpserver at the configuration level. By entering? at the arpserver level, the list of available subcommands for arpserver is displayed.

```
myswitch::configuration atmarp arpserver> ?
show set
```

### 1.2.1.1 Displaying the ARP Server Address

This command shows which interfaces are enabled to be the RFC-1577 ATM ARP server for the IP network. Enter the following parameters:

```
      myswitch::configuration atmarp arpserver> show <interface>

      myswitch::configuration atmarp arpserver> show

      Interface
      ARP Server Addr
      Enabled

      qaa0
      0x47.0005.80.ffe100.0000.f21a.3445.0020481a3445.00
      Yes

      qaa1
      0x47.0005.80.ffe100.0000.f21a.3445.0020481a3445.01
      Yes

      qaa2
      0x47.0005.80.ffe100.0000.f21c.06db.0020481c06db.02
      No

      qaa3
      0x47.0005.80.ffe100.0000.f21a.3445.0020481a3445.03
      Yes
```

Field	Description
Interface	The classical IP interfaces for this switch.
ARP Server Addr	The ARP server address for this interface.
Enabled	Shows whether or not ARP server service is enabled for this interface.

#### 1.2.1.2 Setting the ARP Server Address

This command allows you to set the address of the RFC-1577 ATM ARP server. Enter the following parameters:

myswitch::configuration atmarp arpserver> set <NSAPaddress> [<interface>]

#### These parameters are defined as follows:

Parameter	Description	
NSAPAddress	The ATM network layer address for the RFC-1577 ATM ARP server.	
interface	Enter the Classical IP interface that will be the arpserver: qaa0, qaa1, qaa2, or qaa3. The default is qaa0.	

The switch itself can be used as an ARP server. To do this, set the ARP server address to be the NSAP address of the switch's control port (port CTL).

### 1.2.2 Deleting an ARP Entry

This command allows you to remove an ARP entry from the ATM ARP cache. Enter the following parameters:

myswitch::configuration atmarp> delete <host>

#### These parameters are defined as follows:

Parameter	Description	
host	The IP address of the endstation for which the outgoing ARP entry is to be deleted.	



If you have ILMI enabled on your switch, ILMI creates an ATM ARP cache entry for each address that it registers. These entries <u>cannot</u> be deleted using this command.

### 1.2.3 Flushing the ATM ARP Cache

This command enables you to delete the contents of the ATM ARP cache. Only dynamic ARP cache entries are removed. The switch asks you to verify that flushing the ARP cache is the desired action. Enter the following parameters:

```
myswitch::configuration atmarp> flush
Flush the ATM ARP cache [n]? n
```

To cancel the command, type n and press <**ENTER>**, or simply type <**ENTER>**. To flush the ARP cache, type y and press <**ENTER>**.

### 1.2.4 Getting the NSAP Address for a Classical IP Interface

This command displays the NSAP address of a Classical IP interface. Enter the following:

```
myswitch::configuration atmarp> getnsap [<interface>]
qaa0 NSAP address: 47000580ffe1000000f2la3445002048la344500
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the Classical IP interface to be displayed <sup>1</sup> : qaa0, qaa1, qaa2, or qaa3.

<sup>1.</sup> If no interface is specified, the NSAP address of qaa0 is displayed.

### 1.2.5 Creating an IP to NSAP Address Mapping

This command allows you to create an ATM ARP cache entry mapping a particular IP address to its corresponding NSAP address. Enter the following parameters:

```
myswitch::configuration atmarp> mapnsap <host> <NSAPaddress> [<interface>]
```

These parameters are defined as follows:

Parameter	Description		
host	The IP address to be mapped.		
NSAPaddress	The NSAP address to be mapped.		
interface	The Classical IP interface that should be used to open connections to this NSAP address: qaa0, qaa1, qaa2, or qaa3. The default is qaa0.		

### 1.2.6 Creating a Classical IP PVC

This command allows you to create a new Classical IP PVC ARP entry. All data is sent LLC/SNAP encapsulated. Enter the following parameters:

myswitch::configuration atmarp> newclassicalip <host> <vpi> <vci> [<interface>]

#### These parameters are defined as follows:

Parameter	Description
host	The host IP address of the remote IP endstation.
vpi	The virtual path number of the Classical IP PVC.
vci	The virtual channel number of the Classical IP PVC.
interface	The Classical IP interface to be used for this connection: qaa0, qaa1, qaa2, or qaa3. The default is qaa0.

### 1.2.7 Creating a FORE IP PVC ARP Entry

This command enables you to create a FORE IP PVC ARP entry. Data on this PVC is encapsulated using null encapsulation (also known as VC-based multiplexing) as specified in RFC-1483. Enter the following parameters:

myswitch::conf atmarp> newforeip <host> <vpi> <vci> (4|5) [<interface>]

#### These parameters are defined as follows:

Parameter	Description
host	The IP address of the remote host.
vpi	The virtual path number of the FORE IP PVC. Must be 0.
vci	The virtual channel number of the FORE IP PVC.
4   5	The connection's ATM Adaptation Layer (AAL) type. The default is 4.
interface	The FORE IP interface to be used for this connection. The default is asx0.

### 1.2.8 Displaying the ATM ARP Entries

This command displays the current ATM ARP cache. Enter the following parameters:

```
myswitch::configuration atmarp> show
myswitch::configuration atmarp>
```

When the prompt is returned with no information displayed, as shown above, then the ATM ARP cache is empty.

The following is an example of an ATM ARP cache.

```
myswitch::configuration atmarp> show
IPaddress
                Ιf
                      VPI
                            VCI
                                                          Direction
                                        Type
198.29.22.9
                            63
                                 aal5 foreIpSVC
                asx0 0
                                                          outgoing
198.29.22.15
                                 aal5 foreIpSVC
                asx0 0
                            231
                                                          pending
198.29.22.37
                asx0 0
                            65
                                 aal34 foreIpSVC
                                                          pending
IPaddress
                Ιf
                      NSAP Address
198.29.17.3
                gaa0 0x47.0005.80.ffe100.0000.f21b.0138.002048102754.00
                gaa0 0x47.0005.80.ffe100.0000.f21b.0137.002048100be6.00
198.29.17.10
                gaa0 0x47.0005.80.ffe100.0000.f21b.0137.00204810048d.00
198.29.17.15
                gaa0 0x47.0005.80.ffe100.0000.f21b.0138.0020481b0138.00
198.29.17.52
```

Field	Description
IPaddress	The IP address for this connection.
If	The name of the IP interface for this connection.
VPI	The virtual path number.
VCI	The virtual channel number.
AAL	The AAL type of the given connection.
Туре	Shows what kind of connection this is. Can be foreIpPVC, foreIpSVC, classicalIp-PVC, or classicalIpSVC.
Direction	Outgoing means this is an outgoing connection. Incoming means this is an incoming connection. Pending means that a connection has not (yet) been established. Incomplete means that the IP-to-ATM address mapping is not yet known for the given IP address.
NSAP Address	The NSAP address for this connection.

# 1.3 ATM Route Configuration Commands

These commands let you configure ATM routing on a switch. You can display the list of available subcommands by typing? at the atmroute level.

### 1.3.1 Displaying ATM Routing Information

This command lets you display all of the ATM routing information from various menus in one screen. Enter the following parameters:

myswit	myswitch::configuration atmroute> <b>show</b>							
Port	VPI	Node	Domain	SigProto	SigSt	NodeSt	HelloSt	PeerSt
1B1	0	ftpnni	1	FT-PNNI(a)	up	up	N/A	N/A
1B2	0	1	1	<pre>privateUNI(a)</pre>	up	up	attempt	N/A
1B3	0	1	1	<pre>privateUNI(a)</pre>	up	up	attempt	N/A
1B4	0	1	1	<pre>privateUNI(a)</pre>	up	up	attempt	N/A
1CTL	0	N/A	1	privateUNI(a)	up	N/A	N/A	N/A

Field	Description		
Port	The port through which the link is attached to the node.		
VPI	The virtual path number on the port.		
Node	For FT-PNNI, shows ftpnni. For PNNI, shows the index number of the node for which the ATM routing information is being displayed.		
Domain	The index number of the domain to which this node belongs.		
SigProto	The signalling protocol being used on this port. (a) means that the switch is trying to automatically configure the protocol and version of that protocol that its peers are using.		
SigSt	The current state of this interface. If the state is up, this interface is operational. This is the normal state for a interface that is connected to another FORE Systems' ATM switch or host. If the state is down, this interface is not operational. This can be due to a lack of a physical connection or due to a software problem.		
NodeSt	The administrative state of this node. up means the node is active. down means the node is inactive.		

Field	Description
HelloSt	The state of the hello protocol running between the peer nodes. down means that the link is not usable, so no routing packets are sent or received over it. attempt means that either no hellos or hellos with mismatch information have been received from the neighbor, and attempts are being made to reach the neighbor by sending hellos at the specified hello interval. oneWayInside means that hellos have been received from the neighbor and the neighbor has established that they are peers, but the neighbor's remote node ID and remote port ID are 0. twoWayInside means that hellos have been received from the neighbor, the neighbor has established that they are peers, and the neighbor has sent the correct remote node ID and remote port ID. Bi-directional communication can occur over this link. oneWayOutside means that hellos have been received from the neighbor and the neighbor has established that they are from different peer groups, but the neighbor's remote node ID and remote port ID are 0. twoWayOutside means that hellos have been received from the neighbor, the neighbor has established that they are from different peer groups, and the neighbor has sent the correct remote node ID and remote port ID, but the nodal hierarchy list does not include a common peer group. commonOutside means that a common level of the routing hierarchy has been found and bi-directional communication can occur over this link.
PeerSt	N/A means the protocol is something other than PNNI, so this field is not applicable. When the protocol is PNNI, shows the state of the database exchange protocol running between this node and the neighboring peer listed. npdown means there are no active links to the neighboring peer. negotiating means the two peers are deciding which one will start the initial topology database exchange. exchanging means this node is sending its topology database to the neighboring node. loading means this node is receiving the neighboring node's topology database. full means this node has received all PTSEs known to be available from the neighboring peer. Links to the neighboring peer can now be advertised in PTSEs.

#### You can also display advanced ATM routing information as follows:

```
myswitch::configuration atmroute> show [<port> [<vpi>]] [advanced]
myswitch::configuration atmroute> show advanced
Port VPI Node Domain SigProto SigSt NodeSt HelloSt
                                                         PeerSt
        ftpnni 1 FT-PNNI(a)
                                up up
                                                          N/A
                                             N/A
         ConfNode ILMI ForeLevel ForeArea PnniLinkType
             up 4
                                         N/A
         DomainProto DomainPrefix
                     0x47.0005.80.ffe100.afce.efed.0000
         gateway
         FtpnniPgMask FtpnniPrefix
                                                     Border
                     0x47.0005.80.ffe100.afce.efed.0000 disabled
Port VPI Node Domain SigProto SigSt NodeSt HelloSt
                                                         PeerSt
1B2 0
        1 1 privateUNI(a) up up attempt
                                                         N/A
         ConfNode ILMI ForeLevel ForeArea PnniLinkType
                up 5
                              5
                                        unknown
         DomainProto DomainPrefix
         gateway
                     0x47.0005.80.ffe100.afce.efed.0000
         PnniPgId
                                        Ptses
         80:47.000580ffe100afcefe000000
                                      3
         PnniNodeId
         80:160:47.000580ffe100afceefed0000.ff1a2d0f0001.00
```

Field	Description
ConfNode	The PNNI node index number for a user-configured interface that was created through the conf atmr pnni interface menu.
ILMI	Up means that ILMI is operational for this interface. <b>Down</b> means that ILMI is not operational for this interface.
ForeLevel	The level of the area used in FORE's hierarchy support.
ForeArea	The ID of the area in FORE's hierarchy support to which this node belongs.
PnniLinkType	Shows what kind of PTSE this is. Can be nodalInformation, internalReachableAddresses, externalReachableAddresses, nodalStateParameters, horizontalLinks, or uplinks.
DomainProto	The default protocol used on all Network-to-Network (NNI) interfaces in the domain. ftpnni means ForeThought PNNI is used for this domain. pnni means ATM Forum PNNI is used for this domain. gateway means this domain includes both the PNNI and FT-PNNI networks so that reachability information can be leaked dynamically between peer groups of both types. This will be a gateway switch (a switch that has one FT-PNNI node and one PNNI node).

Field	Description
DomainPrefix	The 13-byte prefix of the domain used in ILMI registration, in the FT-PNNI switch prefix, and the PNNI node ID. This prefix is also used as the default 13-byte policy summary.
FtpnniPgMask	The mask that gives the number of leading bits in the switch prefix used to aggregate the addresses that belong to this <i>ForeThought</i> PNNI peer group. This field is displayed only if the protocol is FT-PNNI.
FtpnniPrefix	The default NSAP prefix for this ATM switch that is used in the ILMI address registration message and in the hello indication FT-PNNI message. This field is displayed only if the protocol is FT-PNNI.
Border	A border switch has a link to at least one other switch that belongs to a different peer group. A border switch advertises reachability information about its peer group to switches outside of its peer group. enabled means this switch acts as a ForeThought PNNI border switch. disabled means this switch does not act as a ForeThought PNNI border switch. This field is displayed only if the protocol is FT-PNNI.
PnniPgId	The peer group ID of the peer group to which this node belongs. This field is displayed only if the protocol is PNNI.
Ptses	The number of PTSEs that belong to this node. This field is displayed only if the protocol is PNNI.
PnniNodeId	The ID of this node. This field is displayed only if the protocol is PNNI.

The first nine fields in this display are defined in the same manner as those listed in the previous **show** command.

# 1.3.2 Configuring a Domain

These commands allow you to configure a domain on a switch. An ATM routing domain is a group of areas that are configured to dynamically exchange reachability information with one another. This allows connectivity between end systems belonging to different areas. Reachability information is exchanged between domains through static configuration only. A switch may be part of multiple domains and there may be multiple domains configured on a switch. (For more information about domains and areas, see the Network Configuration manual for your switch.) You can display the available subcommands by typing? at the domain level.

# 1.3.2.1 Deleting a Domain

This command allows you to delete an existing domain. Enter the following parameters:

```
myswitch::configuration atmroute domain> delete <domain ID>
```

## 1.3.2.2 Modifying a Domain

This command allows you to modify an existing domain. Enter the following parameters:

```
myswitch::configuration atmroute domain> modify <domain ID> [-name <name>]
[<ftpnni | pnni | gateway>][-prefix prefix>] [-defsum <enable | disable>]
```





If you modify the domain, the switch prompts for a reboot. You must type y and reboot the switch for your change to take effect.

If the existing domain is pnni or gateway, and the prefix of the domain is changed, you must first disable the PNNI node using conf atmr pnni node admin <nodeid> down. This removes any transient routes related to the node address with the old prefix.

# 1.3.2.3 Creating a Domain

This command allows you to create a new domain. Enter the following parameters:

```
myswitch::configuration atmroute domain> new <domain ID> [-name <name>]
[-prefix <prefix>] [-defsum <enable | disable>]
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
domain ID	The index number of this domain. Displayed in the the Index field under confatmroute domain show.
name	The optional, user-assigned name of this domain. Displayed in the Name field under confatmroute domain show.
ftpnni pnni gateway	The default routing protocol to use on all Network-to-Network (NNI) interfaces in the domain. ftpnni means ForeThought PNNI is used for this domain. pnni means ATM Forum PNNI is used for this domain. gateway means this domain includes both the PNNI and FT-PNNI networks so that reachability information can be leaked dynamically between peer groups of both types. This will be a gateway switch (a switch that has one FT-PNNI node and one PNNI node). The default routing protocol is ftpnni.
prefix	The 13-byte prefix of the domain used in ILMI registration, used in the FT-PNNI switch prefix, and used in determining the PNNI node ID, PNNI peer group, and PNNI ATM address. This prefix is also used as the default 13-byte policy summary. If you have two PNNI domains in a switch, be sure to assign each one a different prefix.
-defsum <enable disable=""  =""></enable>	Enables or disables the ability to summarize all local addresses into a default, 10-byte summary switch prefix, and advertise this summary in PNNI as an internal reachable address PTSE and in FT-PNNI topology. Modifying this parameter does not require a reboot; the change takes effect immediately. The default value is disable.

# 1.3.2.4 Displaying Domain Information

This command allows you to display information about all of the existing domains. Enter the following parameters:

myswitch::configuration atmroute domain> show

ID Name Defproto Prefix Defsum

1 default ftpnni 0x47.0005.80.ffe100.0000.f21a.3445 ENABLED

The fields in this display are defined as follows:

Field	Description
ID	The index number of this domain.
Name	The user-assigned name of this domain.
Defproto	The default routing protocol used on all Network-to-Network (NNI) interfaces in the domain. ftpnni means ForeThought PNNI is used for this switch in this domain. pnni means ATM Forum PNNI is used for this switch in this domain. gateway means this switch includes both the PNNI and FT-PNNI networks in this domain so that reachability information can be leaked dynamically between peer groups of both types.
Prefix	The address prefix of the domain.
Defsum	Shows if the ability to summarize all local addresses into a default, 10-byte summary switch prefix is enabled or disabled.

# 1.3.3 ForeThought PNNI Configuration Commands

These commands allow you to configure *ForeThought* PNNI on a switch. You can display the list of available subcommands by typing? at the ftpnni level.

myswitch::configuration atmroute ftpnni> ? d+1> forelevel border forearea hello maxhop metric> minthresh nsapindication pgmask pgsncost prefix propmult staticroute> swmask vcmark show

# 1.3.3.1 Changing the ForeThought PNNI Border Switch Functionality

A switch that has a link to another switch that belongs to a different peer group is considered a border switch. A border switch advertises reachability information about its peer group to switches outside of its peer group. You should enable border switch functionality on all switches in a peer group that have direct outside links to other peer groups. This command lets you designate whether or not this switch will act as a *ForeThought PNNI* border switch. Enter the following parameters:

myswitch::configuration atmroute ftpnni> border (enable | disable)



The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

These parameters are defined as follows:

Parameter	Description
enable	Entering enable (and rebooting) means that this switch will act as a ForeThought PNNI border switch.
disable	Entering disable (and rebooting) means that this switch will not act as a <i>ForeThought</i> PNNI border switch.

# 1.3.3.2 DTL Configuration Commands

These commands let you create, delete, and display Designated Transit Lists (DTLs). A DTL is a source route for the *ForeThought* PNNI (FT-PNNI) router which specifies the preferred call routing for the SVC portion of a directed SPVC. A DTL is a source route (index) and each entry (row) in the DTL represents a single hop in the source route. Each hop is represented by a FT-PNNI node and the logical output port at that node. The FT-PNNI node's address is determined by the switch's NSAP prefix and mask. The logical port is determined by the link ID and the VPI. You can display the list of available subcommands by typing? at the dtl level.

#### 1.3.3.2.1 Deleting a DTL Entry

This command enables you to remove an existing DTL. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni dtl> delete <index> (<row> |all)
```

For example, if you want to delete row 2 of index entry 9, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> delete 9 2
```

Similarly, if you want to delete every row in index entry 9, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> delete 9 all
```

# 1.3.3.2.2 Modifying a DTL Entry

This command allows you to modify a DTL entry. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni dtl> modify <index> <row>\
(prefix | mask | port | vpi) <new_value>
```

For example, to modify the port of index entry 9, row 2 to port D1, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> modify 9 2 port D1
```

Similarly, to modify the mask of index entry 12, row 1 to a mask of 104, enter the following:

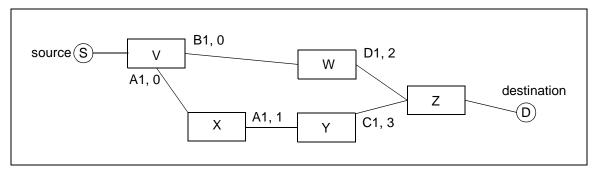
```
myswitch::configuration atmroute ftpnni dtl> modify 12 1 mask 104
```

#### 1.3.3.2.3 Creating a DTL Entry

This command allows you to create a DTL. Enter the following parameters:

```
myswitch::configur atmroute ftpnni dtl> new <index> <row> <prefix> <mask> <port> <vpi>
```

The following is an example of how to create DTLs for the simple network shown.



For example, if you want to create a DTL from endpoint S to endpoint D, enter something similar to the following:

```
myswitch::configuration atmroute ftpnni dtl> 1\ 1\ 0x47000580ffe1000000f21b19c3\ 104 Al 0\ 0x47000580ffe1000000f21b24a2\ 104 Al 0\ 0x47000580ffe1000000f21b24a2\ 104 Al 0\ 0x47000580ffe1000000f21b24a2\ 104 Al 0\ 0x47000580ffe1000000f21b18a1\ 104 Cl 0\ 0x47000580ffe10000000f21b18a1\ 104 Cl
```

This creates a DTL that routes through switches V, X, Y, and Z. The prefix in each line changes to match the prefix of each switch through which the route is going. Notice that you do not specify switch Z in the DTL. You could also create another DTL using a different route through switches V, W, and Z as follows:

```
myswitch::configuration atmroute ftpnni dtl> 2 1 0x47000580ffe1000000f21b19c3 104 B1 0 myswitch::configuration atmroute ftpnni dtl> 2 2 0x47000580ffe1000000f21b17c1 104 D1 2
```

Again, you do not specify switch Z in the DTL.

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
index	The index number of a DTL. Displayed in the Index field under conf atmroute ftpnni dtl show.
row	The row number of the individual entry within a given DTL. An entry in the DTL is given a row number equal to its position in the source route. Thus, the entry corresponding to the first hop is row 1, the second hop is row 2, and so on. Displayed in the Row field under conf atmroute ftpnni dtl show.
all	Used only with the delete command. Indicates that you want to delete all of the entries within a given DTL.
prefix	Indicates the 13-byte NSAP prefix of the node ID of this DTL entry. In <i>ForeThought</i> PNNI, the node IDs are prefixes that represent both the ID of the node and a summary of reachable addresses.
mask	The subnet mask is the significant part of the prefix when matching an address. Gives the length of the above prefix in number of bits. Can vary from 0 - 104 (13 bytes).
port	The output port number for the node given by the above node ID. This is also the port to which the next node in the DTL (if there is one) is connected. You only need to specify the network module and port numbers, not the board number (c1 instead of 1c1).
vpi	The output path number in the above output port. This is the signalling path to the peer given by the next node in the DTL.
new_value	Used only with the modify command. Indicates the actual value that you wish to use for one of the above parameters. Can be the new prefix, mask, port, or vpi number.

### 1.3.3.2.4 Displaying DTLs

This command lets you display the current DTLs. Enter the following parameters:

```
      myswitch::configuration atmroute ftpnni dtl> show

      Index
      Row
      NSAP prefix
      Mask
      Port
      VPI

      10
      1
      0x47.0005.80.ffel00.0000.f2lb.19c3
      104
      C1
      0

      2
      0x47.0005.80.ffel00.0000.f2lb.19a1
      104
      C2
      0
```

### The fields in this display are defined as follows:

Field	Description
Index	The index number of each of the current DTLs.
Row	The row number of each entry within each DTL. Each entry in the DTL has a row number equal to its position in the source route, so the entry corresponding to the first hop is row 1, the second hop is row 2, and so on.
NSAP prefix	The NSAP prefix part of the node ID of this DTL entry. In <i>ForeThought</i> PNNI, the node IDs are prefixes that represent both the ID of the node and a summary of reachable addresses.
Mask	The mask corresponding to the prefix, which gives the length of the above prefix in number of bits.
Port	The output port for the node given by the above node ID. This is also the port to which the next node in the DTL (if there is one) is connected.
VPI	The output path in the above output port. This is the signalling path to the peer given by the next node in the DTL.

You can also display an individual DTL by entering the following parameters:

# If no DTLs exist, the following is displayed:

```
myswitch::configuration nsap dtl> show
No DTLs available
```

# 1.3.3.3 Configuring the FORE Area

This command lets you set the value of the FORE Area ID. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> forearea <forearea>
```

The switch cautions you that a reboot is necessary. It asks if you want to continue with the change in case you made a mistake. To abort the change, type n or press <ENTER>. No change will be made. To continue with the change, type y. If you type y, you will be asked if you want to reboot the switch. You must reboot the switch for this change to take effect, so type y or press <ENTER>.

```
This change requires a reboot to prevent any potential routing problem. Do you want to continue with the change [n]? \mathbf{y} Reboot the switch [y]? \mathbf{y}
```

This parameter is defined as follows:

Parameter	Description
forearea	The ID of the area in the FORE hierarchy to which this <i>ForeThought</i> PNNI node belongs. This can be a value between 1 and 127. The default is 4.

# 1.3.3.4 Configuring the FORE Level

This command lets you set the value of the FORE Level. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> forelevel <forelevel>
```

The switch cautions you that a reboot is necessary. It asks if you want to continue with the change in case you made a mistake. To abort the change, type **n** or press **ENTER**. No change will be made. To continue with the change, type **y**. If you type **y**, you will be asked if you want to reboot the switch. You must reboot the switch for this change to take effect, so type **y** or press **ENTER**.

```
This change requires a reboot to prevent any potential routing problem. Do you want to continue with the change [n]? \mathbf{y} Reboot the switch [y]? \mathbf{y}
```

This parameter is defined as follows:

Parameter	Description
forelevel	The level of the area to which this <i>ForeThought</i> PNNI node belongs in the FORE hierarchy. This can be a value between 1 and 127. The default is 4.

## 1.3.3.5 Setting the Hello Indication Interval

Hello indication messages are the "keep alive" messages that two switches send to one another to verify their existence. This command lets you change the interval for *ForeThought* PNNI hello indication messages. Enter the following parameters:

myswitch::configuration atmroute ftpnni> hello <msec>

#### This parameter is defined as follows:

Parameter	Description
hello	The period of time between transmissions of hello indication messages. The default 500 microseconds.

# 1.3.3.6 Setting the Maximum Hop Count

This command lets you set the maximum hop count for the NSAP router. By setting a maximum hop count, you tell the switch to consider only those paths that have less than or equal to the number of hops specified when setting up a connection. If a connection is routed using a path with a large hop count, there is a greater chance that the connection may experience congestion and be delayed or discarded. Enter the following parameters:

myswitch::configuration atmroute ftpnni> maxhop <hops>

#### This parameter is defined as follows:

Parameter	Description
maxhop	The maximum number of hops to use when routing a connection for the NSAP router. The default is 20 hops.

# 1.3.3.7 ForeThought PNNI Metric Configuration Commands

These commands allow you to configure *ForeThought* PNNI metric sets. You can display the list of available subcommands by typing? at the metric level.

#### 1.3.3.7.1 Deleting a Metric Set

This command lets you delete a metric set. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> delete <tag>
```

### 1.3.3.7.2 Modifying a Metric Set

This command lets you modify a metric set. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> modify <tag> [-cost <cost>]
[-cbrcap <cbrcap>] [-vbrcap <vbrcap>]
```

## 1.3.3.7.3 Creating a Metric Set

This command lets you create a metric set that is used when creating a policy for a FT-PNNI static route. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> new <tag> [-cost <cost>]
[-cbrcap <cbrcap>][-vbrcap <vbrcap>]
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
tag	Indicates a unique integer that identifies this metric set.
-cost <cost></cost>	The cost of reaching the address encompassed by this policy.
-cbrcap <cbrcap></cbrcap>	The CBR capacity of the link to reach the address encompassed by this policy.
-vbrcap <vbrcap></vbrcap>	The VBR capacity of the link to reach the address encompassed by this policy.

### 1.3.3.7.4 Displaying Metric Set Information

This command lets you display metric set information. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> show
  Tag Cost CBRCAP VBRCAP
  1 10 10 10
  Tag Cost CBRCAP VBRCAP
  2 128 10 200
```

### The fields in this display are defined as follows:

Field	Description
Tag	The unique integer number that identifies this metric set.
Cost	The cost of reaching the address encompassed by this policy.
CBRCAP	The CBR capacity of the link to reach the address encompassed by this policy.
VBRCAP	The VBR capacity of the link to reach the address encompassed by this policy.

You can also display information about a specific tag as follows:

```
myswitch::configuration atmroute ftpnni metric> show [<tag>]
myswitch::configuration atmroute ftpnni metric> show 2
Tag Cost CBRCAP VBRCAP
2 128 10 200
```

If no metrics have been configured, then the following is displayed:

```
myswitch::configuration atmroute ftpnni metric> show
No metric information is available
```

## 1.3.3.8 Setting a Minimum Threshold for NSAP Updates

The minimum threshold is the smallest capacity value that the threshold value for determining the significant change in ACR can take. This minimum value ensures that the threshold value does not become a very small value in cases in which the product of the ACR and the proportional multiplier is a very small number. The minimum threshold is used to prevent excessively frequent NSAP updates resulting from minor changes in ACR when the value of ACR is very low. Enter the following parameters:

myswitch::configuration atmroute ftpnni> minthresh <minthresh>

#### This parameter is defined as follows:

Parameter	Description
minthresh	The minimum threshold bandwidth value for triggering NSAP updates. The default is 50 Kbps.

# 1.3.3.9 Setting the NSAP Indication Interval

NSAP indication messages are those messages that update topology information between any two switches. This command lets you set the interval between *ForeThought* PNNI NSAP indication messages. Enter the following parameters:

myswitch::configuration atmroute ftpnni> nsapindication <msec>

#### This parameter is defined as follows:

Parameter	Description
nsapindication	The period of time between transmissions of NSAP indication messages. The default is $10,\!000$ microseconds.

# 1.3.3.10 Setting the ForeThought PNNI Peer Group Mask

A peer group mask is the length (in the number of bits) of the peer group ID of a switch. This command enables you to set the *ForeThought* PNNI peer group mask value. This value should be the same for all members of a peer group. Enter the following parameters:

myswitch::configuration atmroute ftpnni> pgmask <mask>

This parameter is defined as follows:

Parameter	Description
pgmask <sup>1</sup>	The mask that gives the number of leading bits in the switch prefix used to aggregate the addresses that belong to this <i>ForeThought</i> PNNI peer group. The default is 0.

<sup>1.</sup> The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

# 1.3.3.11 Selecting the Method for Computing the Cost of a Link

This command lets you select the method of computing the cost of a link from a border node to the peer group summary node (PGSN). Enter the following parameters:

myswitch::configuration atmroute ftpnni> pgsncost (default | user -cost <cost>)

These parameters are defined as follows:

Parameter	Description
default	The border node automatically calculates the cost to the PGSN by taking half of the average cost from this node to all other border nodes in this peer group. This cost is dynamic.
user	The link to the PGSN from this border node will be advertised using the value that you specify with the <code>-cost</code> parameter.
-cost <cost></cost>	Enter the administrative weight for the link that you want the border node to use during path computation. The route which takes the least cost is chosen. The default cost for all links in the network is 100.

# 1.3.3.12 Setting the ForeThought PNNI Switch Prefix

When using ForeThought PNNI, a switch fabric is identified by an NSAP switch prefix which consists of 13 fixed bytes. The variable 13-byte mask configured using conf atmroute ftpnni swmask determines which bytes are actually significant. This command lets you set the ForeThought PNNI prefix on the switch. Enter the following parameters:

myswitch::configuration atmroute ftpnni> prefix prefix>

#### This parameter is defined as follows:

Parameter	Description
prefix <sup>1</sup>	The FT-PNNI prefix for this ATM switch that is used in the hello indication FT-PNNI message.

The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

# 1.3.3.13 Setting the Proportional Multiplier

This command enables you to set the proportional multiplier for the NSAP router. The proportional multiplier is expressed as a percentage of Available Cell Rate (ACR) on any given link in the network. If the change in percentage of the ACR on any given link in the NSAP topology of the network exceeds this percentage threshold, then the change is considered significant. The topology tables are updated accordingly for that link. Enter the following parameters:

myswitch::configuration atmroute ftpnni> propmult <percentage>

#### This parameter is defined as follows:

Parameter	Description
propmult <sup>1</sup>	The threshold above which you consider the change in ACR on any link to be significant. The default is $20\%$ .

<sup>&</sup>lt;sup>1.</sup> If you modify this value, you should modify it on all switches in the network.

### 1.3.3.14 Static Route Configuration Commands

These commands let you create, delete, and display static routes. You can display the list of available subcommands by typing ? at the staticroute level.

### 1.3.3.14.1 Deleting a Static Route

This command enables you to remove an existing static route. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni staticroute> delete <NSAP> <mask> <port> <vpi>
```

#### 1.3.3.14.2 Creating a Static Route

This command allows you to create a static route. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni staticroute> new <NSAP> <mask> <port> <vpi>
[-cost <cost>][-cbr cap <cbr cap>] [-vbr cap <vbr cap>]
```

The following is an example of how to create an NSAP static route:

```
myswitch::configuration atmroute ftpnni staticroute> new
0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00 152 1c2 0 -cost 200 -cbr_cap 20000
-vbr cap 30000
```

# The parameters for delete and new are defined as follows:

Parameter	Description
NSAP	The complete 20-byte NSAP route address in hexadecimal format.
mask	The bit mask indicating number of high-order bits to use for routing purposes. The default mask for the route to the host is 152 and the default mask for the route to the switch is 104.
port	The port number through which this static route can be reached.
vpi	The UNI signalling path through which this static route can be reached.
-cost <cost></cost>	Used only with the new command. The routing metric for this link. There is a cost for each link in a route. The sum of these link costs determines the overall cost of a route. To expedite traffic on a route, try to minimize the overall cost of a route. For a critical route, then, choose a small cost value. For a lesser important route, choose a higher cost value.
-cbr_cap <cbr_cap></cbr_cap>	Used only with the new command. The maximum CBR (Constant Bit Rate) capacity allowed for any single connection on this route. This number is limited by the actual CBR capacity available on the output link specified for this route.
-vbr_cap <vbr_cap></vbr_cap>	Used only with the new command. The maximum VBR (Variable Bit Rate) capacity allowed for any single connection on this route. This number is limited by the actual VBR capacity available on the output link specified for this route.

### 1.3.3.14.3 Displaying Static Routes

This command lets you display the current static routes. Enter the following parameters:

```
      myswitch::configuration atmroute ftpnni
      staticroute> show

      NSAP-address
      Mask
      Port
      VPI
      Cost
      CBR
      VBR

      47000580ffe1000000f21511f200204810046400
      152
      1c2
      0
      200
      20.0
      30.0

      47000580ffe1000000f21511f20020481ee00000
      144
      1c3
      0
      100
      70.0
      60.0

      47000580ffe1000000f21511f20020481ff00000
      144
      1c1
      0
      100
      INF
      INF

      47000580ffe1000000f21511f20020481ff12300
      152
      1c3
      0
      100
      INF
      INF
```

The fields in this display are defined as follows:

Field	Description
NSAP-address	Shows the 20-byte address for which the static route is configured.
Mask	The bit mask indicating number of high-order bits to use for routing purposes. The default mask for a static route to a host is 152 and the default mask to another switch is 104.
Port	The port number on which the NSAP route exists.
VPI	The number of the virtual path on which the NSAP static route exists.
Cost	The routing metric for this link. There is a cost for each link in a route. The sum of these costs determines the overall cost of a route. To expedite traffic on a route, try to minimize the overall cost of a route. A small cost value is assigned to a critical route, while a higher cost value is assigned to a lesser important route. The default is 100.
CBR	The maximum CBR capacity allowed for any single connection on this route. INF means that you did not specify a value for this parameter when the route was created, so the value defaults to the capacity available on the outgoing link.
VBR	The maximum VBR capacity allowed for any single connection on this route. INF means that you did not specify a value for this parameter when the route was created, so the value defaults to the capacity available on the outgoing link.

You can also display static route information for an individual NSAP address, or NSAP address and mask as follows:

```
      myswitch::configuration atmroute ftpnni
      staticroutes
      show [ <NSAP | [ <mask > ] ]

      myswitch::configuration atmroute ftpnni
      staticroute > show

      47000580ffe1000000f21511f200204810046400
      152

      NSAP-address
      Mask Port VPI Cost CBR VBR

      Mbs
      Mbs

      47000580ffe10000000f21511f200204810046400
      152 1C2 0 200 200 200 30.0
```

If you have not configured any static routes, then the following message is displayed:

```
myswitch::configuration atmroute ftpnni staticroute> show
No NSAP static route information is available
```

## 1.3.3.15 Setting the ForeThought PNNI Switch Prefix Mask

This command allows you to select the *ForeThought* PNNI switch prefix mask value. Enter the following parameters:

myswitch::configuration atmroute ftpnni> swmask <mask>

#### This parameter is defined as follows:

Parameter	Description
swmask <sup>1</sup>	The mask that gives the number of leading bits in the switch prefix used to aggregate the addresses that belong to the switch in <i>ForeThought</i> PNNI. The default is 104.

The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

# 1.3.3.16 Setting a Minimum Virtual Channel Mark

When the number of available virtual channels on a path drops to zero, a link state update is sent out to advertise that there are no more VCs available for use on this path. When the number of VCs indicated by the vcmark is available for use on this path again, another link state update is sent out to advertise that there are VCs available for use on this path once again. This command lets you set the vcmark, which is the minimum number of virtual channels that need to be to available on a path to make that path usable again. Enter the following:

myswitch::configuration atmroute ftpnni> vcmark <vcmark>

#### This parameter is defined as follows:

Parameter	Description
vcmark	The minimum number of virtual channels that need to be available on a path to make that path usable. The default is 20.

# 1.3.3.17 Displaying ForeThought PNNI Parameters

This command lets you display all of the *ForeThought PNNI* topology parameters. Enter the following:

myswitch::configuration atmroute ftpnni> **show** 

Switch NSAP prefix Switch Prefix Mask Peer Group Mask	0x47.0005.80.ffe100.0000.f21c.078e 104
Hello Indication Interval	500 msec
NSAP Indication Interval	10000 msec
Max hop count for NSAP router	20 hops
Proportional Multiplier	20 %
Minumum Threshold for NSAP updates	50 Kbps
Minimum VC level	20
Fore Area	4
Fore Level	4
Cost of link to PGSN	100
Cost of link to PGSN computing method	default

FORE PNNI border switch functionality is enabled

## The fields in this display are defined as follows:

Field	Description
Switch NSAP prefix	The switch's NSAP prefix.
Switch Prefix Mask	The switch prefix mask value of high-order bits to use for aggregating addresses on the switch for routing purposes.
Peer Group Mask	The peer group mask value of high-order bits to use for aggregating addresses on the switch for routing purposes.
Hello Indication Interval	The period of time between transmissions of hello indication messages.
NSAP Indication Interval	The period of time between transmissions of NSAP indication messages.
Max hop count for NSAP router	The maximum number of hops to use when routing a connection for the NSAP router.
Proportional Multiplier	The threshold above which the change in ACR on any link is considered to be significant.
Minimum Threshold for NSAP updates	The minimum threshold bandwidth value for triggering NSAP updates.
Minimum VC level	The minimum number of VCs that need to be available on a path to make that path usable again after the number of available VCs has dropped to 0.

Field	Description
Fore Area	The ID of the area in the FORE hierarchy to which this ForeThought PNNI node belongs.
Fore Level	The level of the area to which this ForeThought PNNI node belongs in the FORE hierarchy.
Cost of Link to PGSN	The administrative weight for the link that the border node uses during path computation to the PGSN. The route which takes the least cost is chosen. This field is displayed on border switches only.
Cost of Link to PGSN computing method	The method used for computing the link cost from the border switch to the PGSN. This field is displayed on border switches only. Can be default or user.
FORE PNNI border switch functionality is disabled	If this functionality is enabled, this switch acts as a ForeThought PNNI border switch. If this functionality is disabled, this switch does not act as a ForeThought PNNI border switch.

# 1.3.4 ATM Forum PNNI Configuration Commands

These commands allow you to configure ATM Forum PNNI on a switch. You can display the list of available subcommands by typing? at the pnni level.

## 1.3.4.1 PNNI Address Configuration Commands

These commands allow you to configure ATM Forum PNNI exterior reachability addresses. You can display the list of available subcommands by typing? at the address level.

```
myswitch::configuration atmroute pnni address> ?
   delete    modify    new    show
```

### 1.3.4.1.1 Deleting a PNNI Exterior Reachability Address

This command deletes the PNNI exterior reachability addresses and static routes between two domains called interdomain routes. Enter the following parameters:

```
myswitch::configuration atmroute pnni address> delete pnni <nodeix> <address> <len> <index> OR/interdomain <domain_id> <address> <len> <dest_domain_id>
```

## 1.3.4.1.2 Modifying a PNNI Exterior Reachability Address

This command lets you modify the PNNI exterior reachability address between two domains. Enter the following parameters:

```
myswitch::configuration atmroute pnni address> modify <nodeix> <address> <len> <index>
[-port <port> -vpi <vpi>] [-mtag <mtag>]
```

# 1.3.4.1.3 Creating a PNNI Exterior Reachability Address

This command lets you create a PNNI exterior reachability address between two domains so they can share reachability information. Enter the following parameters:

```
myswitch::configuration atmroute pnni address> new pnni <nodeix> <address> <len> <index>
-port <port> -vpi <vpi> [-mtag <mtag>] [-vpcap <true | false>] OR
new interdomain <domain_id> <address> <len> <dest_domain_id>
```

# The parameters for delete, modify, and new are defined as follows:

Parameter	Description
nodeix	The index number of the source node for which a static route is being configured.
address	The source address prefix (19 bytes long).
len	The number of significant bits in the source address prefix.
index	The index number for this static route. This is used in combination with address and len. More than one static route can be configured on a given port with the same address and len values, as long as the index numbers are different.
-port <port></port>	The number of the port to which the static route is attached.
-vpi <vpi></vpi>	The virtual path number to which the static route is attached.
-mtag <mtag></mtag>	The metrics tag from the conf pnni metric menu that is associated with this static route.
domain_id	The domain identifier of this domain (the domain from which the static route is originating).
address	The destination address prefix (19 bytes long).
len	The number of significant bits in the destination address prefix.
dest_domain_id	The domain identifier of the destination domain.

### 1.3.4.1.4 Displaying PNNI Exterior Reachability Address Information

This command lets you display information about any statically configured reachability addresses between this domain and other domains. These routes allow two directly connected domains to share reachability information. Enter the following parameters:

#### The fields in this display are defined as follows:

Field	Description			
Node	The index number of the node for which the static route is being displayed.			
Address	The source address prefix (19 bytes long).			
Plen	The number of significant bits in the source address prefix.			
Index	The index number for this static route, used in combination with Address and Plen. More than one static route can be configured on a given port with the same Address and Plen values, as long as the index numbers are different.			
Port	The number of the port to which the static route is attached.			
VPI	The virtual path number to which the static route is attached.			
Туре	Shows what type of reachability address this is, based on what was configured in the conf atmr policy menu. This field is read-only.			
Proto	mgmt means that the addresses displayed are those addresses that are configured via AMI (configured from SNMP). This field is read-only.			
Scope	Shows the scope, which is the highest level at which this reachability information can be advertised. If the address has a scope indicating a level lower than the level of the node, the node will not advertise it. If the address has a scope indicating a level higher than or equal to the level of the node, the node will advertise it to its peer group. The default is 0, which means that the address will be advertised to all levels. This field is read-only.			
VPcap	true means that this interface has VP switching capability and false means that it does not. This field is read-only and set to false.			
Mtag	The metrics tag from the conf pnni metric submenu that is associated with this static route. This field is read-only.			

Field	Description
OperStatus	Shows if just the summarized prefix of this address will be announced to the node's peer group, if the entire address will be advertised to the node's peer group, or if this address will not be announced to the node's peer group at all. This field is read-only.
Domain	The domain identifier of this domain (the domain from which the static route is originating).
Address	The destination address prefix (19 bytes long).
Plen	The number of significant bits in the destination address prefix.
Destn	The domain identifier of the destination domain.

You can also display just certain portions of the reachability information. Enter the following parameters:

```
myswitch::configuration atmroute pnni> address show [(pnni | interdomain) [<nodeix>
[<address> [<len> [<index>]]]]]
```

For example, you can show just the PNNI reachability information as follows:

The fields in this display are defined in the same manner as those in the previous example. You can show just the ATMR inter-domain route information as follows:

The fields in this display are defined in the same manner as those in the previous example. If no PNNI addresses have been configured, then the following is displayed:

```
myswitch::configuration atmroute pnni address> show
No route address information is available
No Inter Domain Route information available
```

## 1.3.4.2 PNNI Crankback Configuration Commands

These commands let you configure crankback on a switch. During PNNI signalling, a call being processed according to a DTL may encounter a blocked node or link along the designated route. Crankback allows a partial reroute of such a rejected call so that it does not have to be cleared all the way back to the source. Additionally, an indication of the blockage is sent to the originator of the DTL. You can display the list of available subcommands by typing? at the crankback level.

```
myswitch::configuration atmroute pnni crankback> ?
show set
```

### 1.3.4.2.1 Displaying the Crankback Setting

This command lets you display the number of times a PNNI call is attempted through crankback on this switch before it is rejected. Enter the following parameters:

```
myswitch::configuration atmroute pnni crankback> show
Number of tries per call : 2
```

The field in this display is defined as follows:

Parameter	Description
Number of tries per call	The total number of times a PNNI call is attempted and retried through crankback before it is rejected. The default is 2.

## 1.3.4.2.2 Configuring the Crankback Setting

This command lets you set the number of times a PNNI call will be retried through crankback on this switch before it is rejected. Enter the following parameters:

```
myswitch::configuration atmroute pnni crankback> set <tries>
```

This parameter is defined as follows:

Parameter	Description
tries	The total number of times a PNNI call is attempted and retried through crankback before it is rejected. The default is 2.

# 1.3.4.3 PNNI Interface Configuration Commands

An ATM Forum PNNI node can be bound to a given network-to-network interface (NNI). This is useful when configuring more than one node on a switch. By default, there is one node on a switch configured with the *ForeThought* PNNI protocol and this node is bound to all existing NNIs. The default NNI routing protocol of the default domain dictates the PNNI interface type. You can display the list of available subcommands by typing? at the interface level.

```
myswitch::configuration atmroute pnni interface> ?
modify show
```

### 1.3.4.3.1 Modifying a PNNI Interface

This command lets you modify a PNNI interface. Enter the following parameters:

The parameters for modify are defined as follows:

Parameter	Description			
port	The port number of the interface to be modified.			
vpi	The virtual path number of the interface to be modified.			
-nodeix <nodeix></nodeix>	The index of the node to which the interface is attached.			
-aggrtoken <aggrtoken></aggrtoken>	The link aggregation token value that is advertised in the Hello protocol. Currently, this parameter is not supported.			
-cbrw <cbrw></cbrw>	The administrative weight of this interface for CBR traffic.			
-rtvbrw <rtvbrw></rtvbrw>	The administrative weight of this interface for real-time VBR traffic.			
-nrtvbrw <nrtvbrw></nrtvbrw>	The administrative weight of this interface for non real-time VBR traffic.			
-abrw <abrw></abrw>	The administrative weight of this interface for ABR traffic.			
-ubrw <ubrw></ubrw>	The administrative weight of this interface for UBR traffic.			

#### 1.3.4.3.2 Displaying a PNNI Interface

This command lets you display information about the PNNI interfaces. Enter the following parameters:

n	nyswit	ch::	config	guration atr	nroute	pnni i	interface	e> show			
	Port	VPI	Node	PortID	AggrT	VPCap	CbrW	RtVbrW	NrtVbrW	AbrW	UbrW
	1A1	0	N/A	0x10000000	0	false	5040	5040	5040	5040	5040
	1A2	0	N/A	0x10000001	0	false	5040	5040	5040	5040	5040
	1A3	0	N/A	0x10000002	0	false	5040	5040	5040	5040	5040
	1A4	0	1	0x10000003	0	false	5040	5040	5040	5040	5040
	1A5	0	1	0x10000004	0	false	5040	5040	5040	5040	5040
	1A6	0	1	0x10000005	0	false	5040	5040	5040	5040	5040
	1CTL	0	N/A	0x10000038	0	false	5040	5040	5040	5040	5040

The fields in this display are defined as follows:

Field	Description
Port	The port number of the interface.
VPI	The virtual path number of the interface.
Node	The index of the node to which the interface is attached.
PortID	The internal representation of this port used by ATM Forum PNNI.
AggrT	The link aggregation token value that is advertised in the Hello protocol. This field is readonly and set to 0.
VPCap	true means that this interface has VP switching capability and false means that it does not. This field is read-only and set to false.
CbrW	The administrative weight of this interface for CBR traffic. The default is 5040.
RtVbrW	The administrative weight of this interface for real-time VBR traffic. The default is 5040.
NrtVbrW	The administrative weight of this interface for non real-time VBR traffic. The default is 5040.
AbrW	The administrative weight of this interface for ABR traffic. The default is 5040.
UbrW	The administrative weight of this interface for UBR traffic. The default is 5040.

You can also display the PNNI interface of a specific port, or a specific port and vpi as follows:

The fields in this display are defined in the same manner as those in the previous example.

# 1.3.4.4 PNNI Metric Configuration Commands

These commands allow you to configure PNNI metric sets. You can display the list of available subcommands by typing? at the metric level.

```
myswitch::configuration atmroute pnni metric> ?
   delete    modify    new    show
```

#### 1.3.4.4.1 Deleting a Metric Set

This command lets you delete a metric set. Enter the following parameters:

```
myswitch::conf atmroute pnni metric> delete <nodeix> <tag> (incoming | outgoing) <index>
```

### 1.3.4.4.2 Modifying a Metric Set

This command lets you modify a metric set. Enter the following parameters:

# 1.3.4.4.3 Creating a Metric Set

This command lets you create a metric set. Enter the following parameters:



A class of service (cbr, rtvbr, nrtvbr, abr, or ubr) must be specified when creating a metric set.

# AMI Configuration Commands

The parameters for delete, modify, and new are defined as follows:

Parameter	Description			
nodeix	The index number of the node to which this metric set belongs.			
tag	Indicates an arbitrary integer that identifies this metric set. 0 is not a valid metric tag error is returned if you attempt to use 0.			
incoming   outgoing	The direction of the metric set with respect to the owning node.			
index	The index number of the metrics being configured within the metric set.			
cbr	Indicates that the metric applies to CBR traffic.			
rtvbr	Indicates the metric applies to real-time VBR traffic.			
nrtvbr	Indicates the metric applies to non real-time VBR traffic.			
abr	Indicates that the metric applies to ABR traffic.			
ubr	Indicates that the metric applies to UBR traffic.			
clpEqual0	Indicates that the advertised GCAC parameters apply to CLP = 0 traffic.			
clpEqual0Or1	Indicates that the advertised GCAC parameters apply to CLP = 0+1 traffic.			
-adminw <adminw></adminw>	The administrative weight value.			
-pcr <pcr></pcr>	The peak cell rate.			
-acr <acr></acr>	The available cell rate.			
-ctd <ctd></ctd>	The cell transit delay.			
-cdv <cdv></cdv>	The cell delay variation.			
-clr <clr></clr>	The cell loss ratio for CLP=0 traffic.			
-clr1 <clr1></clr1>	The cell loss ratio for CLP=0+1 traffic.			
-crm <crm></crm>	The cell rate margin.			
-vf <vf></vf>	The variance factor.			

### 1.3.4.4.4 Displaying Metric Set Information

This command lets you display metric set information. Enter the following parameters:

myswitch::configuration atmroute pnni metric> show Node Tag Direction Index Cbr RtVbr NrtVbr Abr Ubr ClpType Adminw incoming 1 false false false false clpEqual0 1 1 5040 PCR ACR CTD(usec) CDV(usec) 4294967295 4294967295 4294967295 4294967295 CLR1 CLR CRM VF 4294967295 4294967295 4294967295 4294967295

The fields in this display are defined as follows:

Field	Description
Node	The index number of the node to which the metric set belongs.
Tag	The integer that identifies this metric set. 0 means there is no metric associated with the route address or with policy.
Direction	The direction of the metric set with respect to the owning node. Can be either incoming or outgoing.
Index	The index number of the RAIG being configured within the metric set.
Cbr   RtVbr   NrtVbr   Abr   Ubr	true means that the RAIG applies to this type of traffic. false means that it does not.
СІрТуре	$\label{local_clpEqual_clpEqual_clpEqual_clpEqual} \begin{tabular}{ll} $\tt clpEqual_$
Adminw	The administrative weight.
PCR	The peak cell rate.
ACR	The available cell rate.
CTD	The cell transit delay.
CDV	The cell delay variation.
CLR	The cell loss ratio for CLP=0 traffic.
CLR1	The cell loss ratio for CLP=0+1 traffic.
CRM	The cell rate margin.
VF	The variance factor.

#### AMI Configuration Commands

You can also display information about a specific node, tag, direction, or index as follows:

```
myswitch::configuration atmroute pnni metric> show [<nodeix>] [<tag>]
[(incoming|outgoing)] [<index>]
myswitch::configuration atmroute pnni metric> show 1 1
Node Tag Direction Index Cbr RtVbr NrtVbr Abr Ubr ClpType
                                                            Adminw
        incoming 1 false false false false false clpEqual0
                                                            5040
         PCR
                     ACR
                                  CTD(usec)
                                                CDV(usec)
         4294967295
                     4294967295
                                  4294967295
                                                 4294967295
         CLR
                     CLR1
                                   CRM
                                                 VF
         4294967295 4294967295
                                  4294967295 4294967295
```

The fields in this display are defined in the same manner as those in the previous example. If no metrics have been configured, then the following is displayed:

```
myswitch::configuration atmroute pnni metric> show
No metric information is available
```

# 1.3.4.5 PNNI Node Configuration Commands

These commands allow you to configure PNNI nodes. You can display the list of available subcommands by typing ? at the **node** level.

### 1.3.4.5.1 Configuring the PNNI Node State

This command lets you bring an existing PNNI node up or take it down. You must administer a node down before you can modify it. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> admin <index> (up | down)
```

### 1.3.4.5.2 Deleting a PNNI Node

This command lets you delete an existing PNNI node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> delete <index>
```

When you delete a node, the switch prompts you with a warning and asks if you really want to delete the node as follows:

```
myswitch::configuration atmroute pnni node> delete 2
```

Deleting a node will delete all addresses, metrics, profiles, policies and other information configured for this node. PNNI interfaces currently attached to this node will be re-attached to any remaining node within the same domain. If there are no remaining nodes, the interfaces will display N/A in the 'Node' column until a new node is created in this domain.

```
Are you sure you want to delete node [n]? y
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** deletes the node.

#### 1.3.4.5.3 Creating a PNNI Node

This command lets you create a PNNI node.



The maximum number of nodes that can be created per switch is 2. There can be 2 PNNI nodes or one FT-PNNI node and one PNNI node.

### Enter the following parameters:

```
myswitch::configuration atmroute pnni node> new <index>
                [-level <level>]
                [-nodeid <nodeid>]
                [-pgid <pgid>]
                [-atmaddr <atmaddr>]
                [-admin (up|down)]
                [-domainname <domainname>]
                [-restrict (true | false)]
                [-ptsehd <ptsehd>]
                [-hellohd <hellohd>] [-hello <hello>]
                [-helloinactf <helloinactf>]
                [-hlinkinact <hlinkinact>]
                [-ptserfr <ptserfr>]
                [-ptselftf <ptselftf>]
                [-rxmt <rxmt>]
                [-avcrpm <avcrpm>] [-avcrmt <avcrmt>]
                [-cdvpm <cdvpm>] [-ctdpm <ctdpm>]
                [-domain <domain>]
```

[-forelevel <level>] [-forearea <area>]

### 1.3.4.5.4 Modifying a PNNI Node

This command lets you modify a PNNI node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> modify <index>
                [-level <level>]
                [-nodeid <nodeid>]
                [-pgid <pgid>]
                [-atmaddr <atmaddr>]
                [-admin (up|down)]
                [-domainname <domainname>]
                [-restrict (true | false)]
                [-ptsehd <ptsehd>]
                [-hellohd <hellohd>] [-hello <hello>]
                [-helloinactf <helloinactf>]
                [-hlinkinact <hlinkinact>]
                [-ptserfr <ptserfr>]
                [-ptselftf <ptselftf>]
                [-rxmt <rxmt>]
                [-avcrpm <avcrpm>] [-avcrmt <avcrmt>]
                [-cdvpm <cdvpm>] [-ctdpm <ctdpm>]
                [-domain <domain>]
                [-forelevel <level>] [-forearea <area>]
```



If you want to modify -level, -nodeid, -pgid, -atmaddr, -domain, -forelevel, or -forearea, you must first administer the node down using -admin down.

The parameters for admin, delete, new and modify are defined as follows:

Parameter	Description
index	The index number of the node.
admin	The administrative status of the node. up means the node is active. down means the node is inactive.
-level <level></level>	The PNNI hierarchy level of this node. The default is 80.
-nodeid <nodeid></nodeid>	The ID of this node.
-pgid <pgid></pgid>	The peer group ID of the peer group to which this nodes belongs.
-atmaddr <atmaddr></atmaddr>	This node's ATM end system address.

Parameter	Description
-domainname <domainname></domainname>	The name of the domain to which this node belongs.
-restrict (true   false)	Indicates whether or not the originating node is restricted only to allow support of SVCs originating or terminating at this node. true means that transit capabilities are restricted (i.e., transit connections are not allowed) and false means that transit connections are allowed. The default is false.
-ptsehd <ptsehd></ptsehd>	The PTSE hold down time, or the minimum interval between updates of any given PTSE. The default is 10 seconds.
-hellohd <hellohd></hellohd>	The hello hold down time, or the minimum interval between successive hello message transmissions. The default is 10 seconds.
-hello <hello></hello>	The period of time between transmissions of hello messages ("keep alive" messages that two nodes send to one another to verify their existence), in the absence of event-triggered hellos. The default is 15 seconds.
-helloinactf < helloinactf>	The number of hello intervals allowed to pass without receiving a hello message, before a link is declared down. The default is 5 counts.
-hlinkinact <hlinkinact></hlinkinact>	The amount of time that a node continues to advertise a horizontal link for which it has not received and processed the logical group node (LGN) horizontal link IG. The default is 120 seconds.
-ptserfr <ptserfr></ptserfr>	The interval between two successive refreshes of a self-originated PTSE in the absence of triggered updates. A node re-originates its PNNI Topology State Elements (PTSEs) at this rate to prevent other nodes from flushing these PTSEs. The default is 1800 seconds.
-ptselftf <ptselftf></ptselftf>	The value used to calculate the initial lifetime of self-originated PTSEs. The initial lifetime is set to the product of the PTSE refresh interval and the PTSE Lifetime Factor. The default is 200%.
-rxmt <rxmt></rxmt>	The interval at which unacknowledged PTSEs are retransmitted. A PTSE is retransmitted every interval unless explicitly acknowledged through the receipt of either an acknowledgment packet specifying the PTSE instance, or the same instance or a more recent instance of the PTSE by flooding. The default is 5 seconds.
-avcrpm <avcrpm></avcrpm>	The proportional multiplier is expressed as a percentage of the last advertised Available Cell Rate (ACR) on any given PNNI link in the network. If the change in percentage of the ACR on any given PNNI link in the NSAP topology of the network exceeds this percentage threshold, then the change is considered significant and the topology tables are updated accordingly for that link. This value indicates the threshold above which you consider the change in Available Cell Rate (ACR) on any PNNI link to be significant. The default is 50%. The range is 1-99%.
-acvrmt <acvrmt></acvrmt>	The minimum threshold is the smallest capacity value that the threshold value for determining the significant change in ACR can take. This minimum value ensures that the threshold value does not become a very small value in cases in which the product of the ACR and the proportional multiplier is a very small number. The minimum threshold prevents excessively frequent NSAP updates resulting from minor changes in ACR when the value of ACR is very low. This value indicates the minimum threshold above which you consider the change in Available Cell Rate (ACR) on any PNNI link to be significant. The default is 3%. The range is 1-99%.

Parameter	Description
-cdvpm <cdvpm></cdvpm>	Indicates the threshold above which you consider the change in Cell Delay Variation (CDV) on any PNNI link to be significant. The default is 25%. The range is 1-99%.
-ctdpm <ctdpm></ctdpm>	Indicates the threshold above which you consider the change in Cell Transit Delay (CTD) on any PNNI link to be significant. The range is 1-99%.
-domain <domain></domain>	The index number of the domain to which this node belongs.
-forelevel <level></level>	The level of the area used in FORE's hierarchy support. This can be a value between 1 and 127. The default is 5.
-forearea <area/>	The ID of the area in FORE's hierarchy support to which this node belongs. This can be a value between 1 and 127. The default is 5.

### 1.3.4.5.5 Displaying PNNI Node Information

This command lets you display PNNI node information. Enter the following parameters:

Field	Description
Node	The index number of this node.
PnniNodeID	The peer group identifier of the peer group to which this node belongs.
Level	The PNNI hierarchy level of the node.
Lowest	True means that this node is a lowest level node. This is a read-only field.
Rstrn	Shows whether or not this is a restricted transit node. true means that it is and false means that it is not.
PeerGroupID	The peer group ID of the peer group to which this node belongs.
PnniAtmAddress	The node's ATM end system address.
Ptses	The number of PTSEs that belong to this node (i.e., the number of PTSEs that are present in this node's database).
OperStat	The current status of this node. Up means the node is currently active. Down means the node is currently inactive.

Field	Description
AdminStat <sup>1</sup>	Reflects any changes that you have made to the status of the node. Up means you want the node to become active. Down means you want the node to become inactive so you can modify one or more of the parameters.
Shutdown	On a rare occasion, the topology database (TDB) can get into an unrecoverable error state which causes the PNNI logical node to shut down. If this happens, the <code>OperStat</code> field is set to down, the <code>Shutdown</code> field is set to <code>true</code> , and an error message is sent to the console. Then the node quits participating in PNNI activities, such as sending hello packets, performing the database exchange, performing path computation, etc. Other AMI <code>confatmrpnni</code> node commands such as <code>admin</code> , <code>modify</code> , and <code>delete</code> are disabled. Other AMI commands under <code>display</code> atmrpnni are disabled (except for <code>link</code> and <code>peer</code> ) and <code>debug</code> dump atmrpnni tdb is disabled. To clear the condition and bring the node up again, you must reboot the switch. The default value is <code>false</code> .
ForeLevel	The level of the area to which this PNNI node belongs in the FORE hierarchy. The default is 5.
ForeArea	The ID of the area in the FORE hierarchy to which this PNNI node belongs. The default is 5.
DomainId	The index number of the domain to which this node belongs. The default is 1.
DomainName	The name of the domain to which this node belongs, if one has been assigned.

<sup>1.</sup> When you change the administrative status from down to up, it takes a few seconds for the operational change to occur and to be reflected in the OperStat field. Therefore, it is possible for the display to show the AdminStat as up, but the OperStat as down. If you refresh the display after two or three seconds, the change will have taken place and be reflected.

You can also display timer information, information about significant changes, or information about a specific node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> show [timer | sigchange] [<nodeix>]
```

To display timer information, enter the following parameters:

```
myswitch::configuration atmroute pnni node> show timer
Node PtseHD
                HelloHD
                           Hello HelloInactF HLinkInact PtseRfr PtseLftF Rxmt
      (100 msec) (100 msec) (sec)
                                             (sec)
                                                        (sec)
                                                                         (sec)
 1
     10
                10
                           15
                                 5
                                             120
                                                        1800
                                                                200%
```

## The fields in this display are defined as follows:

Field	Description
Node	The index number of this node.
PtseHD	The minimum interval, in microseconds, between updates of any given PTSE.
HelloHD	The minimum interval, in microseconds, between successive hello message transmissions.
Hello	The period of time, in seconds, between transmissions of hello, or "keep-alive" messages, in the absence of event-triggered hellos.
HelloInactF	The number of hello intervals allowed to pass without receiving a hello message, before a link is declared down.
HLinkInact	The amount of time, in seconds, that a node continues to advertise a horizontal link for which it has not received and processed the logical group node (LGN) horizontal link IG.
PtseRfr	The interval, in seconds, between re-originations of a self-originated PTSE in the absence of triggered updates. A node re-originates its PNNI Topology State Elements (PTSEs) at this rate to prevent other nodes from flushing these PTSEs.
PtseLftF	The value used to calculate the initial lifetime of self-originated PTSEs. The initial lifetime is set to the product of the PTSE refresh interval and the PTSE Lifetime Factor.
Rxmt	The interval, in seconds, at which unacknowledged PTSEs are retransmitted. A PTSE is retransmitted every interval unless explicitly acknowledged through the receipt of either an acknowledgment packet specifying the PTSE instance, or the same instance or a more recent instance of the PTSE by flooding.

### To display information about significant changes, enter the following parameters:

```
myswitch::configuration atmroute pnni node> show sigchange
Node AvcrPm AvcrMt CdvPm CtdPm
1 50% 5% 25% 50%
```

Field	Description
Node	The index number of this node.
AvcrPm	A change in the Available Cell Rate by this percentage is considered to be significant, provided the change is more than the threshold value specified using AvcrMt.
AvcrMt	The minimum threshold for change in Available Cell Rate after which AvcrPm is used to find the significant change. AvcrMt is expressed as a percentage in Maximum Cell Rate.
CdvPm	A change in Cell Delay Variation by this percentage is considered to be significant.
CtdPm	A change in Maximum Cell Transfer Delay by this percentage is considered to be significant.



A significant change in any of the above parameters will result in a re-origination of the PTSE.

You can also display information about a specific node. Enter the specific node number as follows:

The fields in this display are defined in the same manner as those listed previously for all of the nodes.

## 1.3.4.6 PNNI Profile Configuration Commands

These commands allow you to configure PNNI path computation profiles. You can display the list of available subcommands by typing? at the profile level.

```
myswitch::configuration atmroute pnni profile> ?
   delete    modify    new    show
```

#### 1.3.4.6.1 Deleting a PNNI Profile

This command lets you delete an existing PNNI path computation profile. Enter the following parameters:

```
myswitch::configuration atmroute pnni profile> delete <nodeix> <profileix>
```

#### 1.3.4.6.2 Modifying a PNNI Profile

This command lets you modify an existing PNNI path computation profile. Enter the following parameters:

## 1.3.4.6.3 Creating a PNNI Profile

This command lets you create a PNNI path computation profile. Enter the following parameters:

# AMI Configuration Commands

The parameters for delete, new, and modify are defined as follows:

Parameter	Description
nodeix	The index number of the node to which the profile belongs.
profileix	The index number of the profile.
cbr   rtVbr   nrtVbr   abr   ubr	Used only with the new command. Indicates for which class of service this profile is used: either cbr, rtVbr, nrtVbr, abr, or ubr.
-minfwdcr <minfwdcr></minfwdcr>	The minimum forward cell rate requirement.
-minrevcr <minrevcr></minrevcr>	The minimum reverse cell rate requirement.
-fwdclptype (clpEqual0 clpEqual0Or1)	clpEqual0 means the requested CLR constraint in the forward direction is for the CLP0 stream. clpEqual00R1 means the requested CLR constraint in the forward direction is for CLP0+1 stream.
-revclptype (clpEqual0 clpEqual0Or1)	clpEqual0 means the requested CLR constraint in the reverse direction is for the CLP0 stream. clpEqual00R1 means the requested CLR constraint in the reverse direction is for CLP0+1 stream.
-fwdclr <fwdclr></fwdclr>	The forward CLR. Applies only to CBR and VBR class of service.
-revclr <revclr></revclr>	The reverse CLR. Applies only to CBR and VBR class of service.
-optctd (true   false)	true means that the profile is to optimize on CTD and false means that it is not. Applies only to CBR and VBR class of service.
-optcdv (true   false)	true means that the profile is to optimize on Cell Delay Variation (CDV) and false means that it is not. Applies only to CBR and VBR class of service.
-loadbal (true   false)	true means that load balancing is activated for the profile and false means that it is not. Applies only to ABR and UBR class of service.
-vponly (true   false)	true means that the profile is for a VP connection and false means that it is not.

#### 1.3.4.6.4 Displaying PNNI Profile Information

This command lets you display PNNI path computation profile information. See Chapter 5 of the ATM *Switch Diagnostics and Troubleshooting Manual* for more information about reading this table. Enter the following parameters:

myswitch::configuration atmroute pnni profile> show Node Profile Service MinFwdCR MinRevCR FwdClpType RevClpType FwdCLR RevCLR 1 cbr N/A N/A clpEqual0 clpEqual0 N/A N/A ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref State inactive mgmtEntry false false false false aw N/A N/A Node Profile Service MinFwdCR MinRevCR FwdClpType RevClpType FwdCLR RevCLR ubr N/A clpEqual0 N/A clpEqual0 N/A N/A State ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref computed cacheEntry false false false false aw 0 0

Field	Description
Node	The index number of the node to which this profile belongs.
Profile	The index number of the profile.
Service	Shows for which class of service this profile is used: either cbr, rtVbr, nrtVbr, abr, or ubr.
MinFwdCR	The minimum forward cell rate requirement.
MinRevCR	The minimum reverse cell rate requirement.
FwdClpType	clpEqual0 means the requested CLR constraint in the forward direction is for the CLP0 stream. clpEqual00R1 means the requested CLR constraint in the forward direction is for CLP0+1 stream.
RevClpType	clpEqual0 means the requested CLR constraint in the reverse direction is for the CLP0 stream. clpEqual00R1 means the requested CLR constraint in the reverse direction is for CLP0+1 stream.
FwdCLR	The forward CLR. Applies only to CBR and VBR class of service.
RevCLR	The reverse CLR. Applies only to CBR and VBR class of service.
State	The current state of the profile.
ProfileType	This is a read-only field. mgmtEntry means this profile is dynamically generated. cacheEntry means this profile is user-configured.
LoadBal	true means that load balancing is activated for the profile and false means that it is not. Applies only to CBR and VBR class of service.
VPOnly	true means that the profile is for a VP connection and false means that it is not.
OptCTD	true means that the profile is to optimize on CTD and false means that it is not. Applies only to CBR and VBR class of service.

Field	Description
OptCDV	true means that the profile is to optimize on Cell Delay Variation (CDV) and false means that it is not. Applies only to CBR and VBR class of service.
OptAdmWt	Shows if the profile will optimize on administrative weight.
NumAvd	A read-only field, for cache profiles only, showing the number of avoided links in this profile.
NumPref	A read-only field, for cache profiles only, showing the number of preferred links in this profile.

You can also display information about a specific node or profile as follows:

```
myswitch::configuration atmroute pnni> profile show [<nodeix>] [profileix>] [advanced]
myswitch::configuration atmroute pnni> profile show 1 1
Node Profile Service MinFwdCR MinRevCR FwdClpType
                                                              FwdCLR RevCLR
                                                 RevClpType
 1
     1 cbr
                     N/A
                              N/A
                                      clpEqual0
                                                  clpEqual0
                                                              N/A
                                                                      N/A
             ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref
     inactive mgmtEntry false false false aw
                                                              N/A
                                                                      N/A
```

The fields in this display are defined in the same manner as those in the previous example.

You can also display advanced information about all of the nodes and profiles or a specific node or profile as follows:

```
myswitch::configuration atmroute pnni profile> show advanced 1 2

Node Profile Service MinFwdCR MinRevCR FwdClpType RevClpType FwdCLR RevCLR

1 2 ubr N/A N/A clpEqual0 clpEqual0 N/A N/A

State ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref
computed cacheEntry false false false aw 0 0

No avoided link information for this profile
No preferred link information for this profile
```

The fields in this display are defined in the same manner as those in the previous example. There is additional information given about avoided or preferred links, if any such information is available.

If no PNNI profiles have been configured, then the following is displayed:

```
myswitch::configuration atmroute pnni profile> show
No profile information is available
```

## 1.3.5 PNNI Policy Prefix Configuration Commands

These commands allow you to configure a policy prefix for a node. A policy allows you to impose rules on how a node propagates information to its peer group about other peer groups. Each policy consists of an ATM address prefix, one of three actions associated with the address, and an optional metric tag. (For more information about policy, see the Network Configuration manual for your switch.) You can display the list of available subcommands by typing? at the policy level.

## 1.3.5.1 Deleting a PNNI Policy Prefix

This command allows you to delete an existing policy prefix. Enter the following parameters:

```
myswitch::configuration atmroute policy> delete <nodeix> <address> <len>
```

## 1.3.5.2 Modifying a PNNI Policy Prefix

This command allows you to modify an existing policy prefix. Enter the following parameters:

```
myswitch::configuration atmroute policy> modify <nodeix> <address> <len>
    [-type (internal | exterior | both)]
    [-action (summary | suppress | advertise)]
    [-mtag <tag>]
```

## 1.3.5.3 Creating a PNNI Policy Prefix

This command allows you to create a new policy prefix. Enter the following parameters:

```
myswitch::configuration atmroute policy> new <nodeix> <address> <len>
    [-type (internal | exterior | both)]
    [-action (summary | suppress | advertise)]
    [-mtag <tag>]
```

# AMI Configuration Commands

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
nodeix	The index number of the node to which the policy applies.
address	The 19-byte address prefix of the policy.
len	The address prefix length of the policy.
-type (internal   exterior   both)	The type of reachable addresses to which the policy applies. internal means the policy applies to internal reachable addresses within that node's FORE hierarchy area. exterior means the policy applies to exterior reachable addresses outside of that node's FORE hierarchy area. both means the policy applies to both internal and exterior addresses. The default is both.
-action (summary   suppress   advertise)	The policy for exchanging dynamic reachability address prefixes. Addresses matching a summary policy cause just the summarized prefix of the address to be announced to the node's peer group. Addresses matching a suppress policy are <u>not</u> announced to the node's peer group at all. Addresses matching an advertise policy cause the entire address to be announced to the node's peer group. An advertise policy is only used to advertise exceptions to a suppress policy. The default is summary.
-mtag <tag></tag>	The metric tag associated with this policy. Look in the Tag field under conf atmroute pnni metric show to find the appropriate tag number. The default is 0.

## 1.3.5.4 Displaying PNNI Policy Prefix Information

This command allows you to display information about existing policy prefixes. Enter the following parameters:

The fields in this display are defined as follows:

Field	Description
Node	The index number of the node to which this policy applies.
Address	The address prefix of the policy.
Plen	The address prefix length of the policy (the significant part of the address).
Туре	The type of reachable addresses to which the policy applies. internal means the policy applies to internal reachable addresses within that node's FORE hierarchy area. exterior means the policy applies to exterior reachable addresses outside of that node's FORE hierarchy area. both means the policy applies to both internal and exterior addresses.
Action	The action to take when using this policy. Addresses matching a summary policy cause just the summarized prefix of the address to be announced to the node's peer group. Addresses matching a suppress policy are not announced to the node's peer group at all. Addresses matching an advertise policy cause the entire address to be announced to the node's peer group.
State	Indicates the current state of this policy. If there are no reachable addresses that match this policy, then the state is listed as inactive. When a summary policy is matched and is being used, the state is listed as summarizing. When a suppress policy is matched and is being used, the state is listed as suppressing. When an advertise policy is matched and is being used, the state is listed as advertising. When a policy is being superseded by another policy, the state is listed as N/A.
Mtag	The metric tag associated with this policy. See the Tag field under conf atmroute pnni metric show.

You can also display specific policy information as follows:

The fields in this display are defined in the same manner as those in the previous example.

## 1.3.6 SPANS ATM Route Configuration Commands

These commands allow you to modify various aspects of SPANS-NNI on a switch. You can display the list of available subcommands by typing? at the spans level.

```
myswitch::configuration atmroute spans> ?
area border show
```



In order for part of a FORE ATM cloud to be a hierarchical SPANS area, all switches in that cloud must be running a software version that is at least *ForeThought 4.0* or greater. Otherwise, SPANS connectivity between the hierarchical area and the SPANS area will be lost.

## 1.3.6.1 Setting the SPANS Area ID

This command enables you to set the SPANS area ID. Enter the following parameters:

```
myswitch::configuration atmroute spans> area <area>
```

This parameter is defined as follows:

Parameter	Description
area <sup>1</sup>	The ID of the area in the SPANS routing hierarchy to which this switch belongs. This number goes into the most significant byte of the SPANS ATM address. The default area ID for all switches is 242 in decimal.

The switch must be rebooted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

## 1.3.6.2 Setting the SPANS-NNI Border Switch Functionality

A switch that has a link to another switch belonging to a different SPANS area is considered a border switch. A border switch advertises reachability to its area to switches outside of its area, but it does not share its area's topology with the other switches. You should enable border switch functionality on all switches that are on the outside edges of all of the areas that you have established. This command lets you designate whether or not this switch will act as a SPANS-NNI border switch. Enter the following parameters:

myswitch::configuration atmroute spans> border (enable | disable)

#### This parameter is defined as follows:

Parameter	Description
enable   disable <sup>1</sup>	Entering enable (and rebooting) means that this switch will be a SPANS border switch. Entering disable (and rebooting) means that this switch will not be a SPANS border switch. The default is disable.

<sup>1.</sup> The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

## 1.3.6.3 Displaying SPANS-NNI Parameters

This command let you display all of the SPANS-NNI topology parameters. Enter the following parameters:

myswitch::configuration atmroute spans> **show**SPANS Area ID 242

SPANS NNI border switch functionality is disabled

Field	Description
SPANS Area ID	The ID of the area in the SPANS routing hierarchy to which this switch belongs. This number goes into the most significant byte of the SPANS ATM address.
SPANS NNI border switch functionality is disabled	If this functionality is enabled, this switch is a SPANS-NNI border switch. If it is ${\tt disabled}$ , this switch is not a SPANS-NNI border switch.

# 1.4 Switch Board Configuration Commands

This submenu lets you configure default values for the switch board. Type ? at the board level to display the available subcommands.

# 1.4.1 Configuring the Clock Scaling Factor on a Switch Board

This is an advanced command that lets you set the clock scaling factor for traffic policing on a switch board. The switch board represents units of time (i.e., burst tolerances) in internal units of clock ticks. Because of the 40 MHz clock used on the switch fabric, the maximum unit of time that can be used by the traffic policing hardware is 0.838 seconds. However, the burst tolerance of some VBR connections is larger than 0.838 seconds, so they can not be correctly policed by the switch. To accommodate these cases, it is possible to scale the clock to represent larger amounts of time with the same number of ticks. Enter the following parameters:

```
myswitch::configuration board> clockscale <board> <factor>
```

These parameters are defined as follows:

Parameter	Description
board <sup>1</sup>	The number of the board (1 - 4) on which the clockscale is being configured.
factor <sup>2</sup>	The factor by which you want to scale the clock. The scaling factor multiplied by $0.838$ seconds should be greater than the burst tolerance of the connection. The default is $1$ .

<sup>1.</sup> The HDCOMP ASIC must be version 1 or greater to support changing the clockscale. To display the ASIC version, use the conf board show advanced command.

If you change the clockscale setting, the following warning is displayed:

```
myswitch::configuration board> clockscale 1 2
  ***** WARNING *****
Changing the Clock Scale Factor will have undesired effects on
existing policed connections until the switch software is restarted.
Restart the switch software [n]?
```

Entering n or pressing <ENTER> aborts the command. Entering y causes the switch to restart and use the new clockscale setting.

<sup>2.</sup> This command is only useful when performing traffic policing on VBR traffic with an extremely large burst tolerance that is destined for a very low speed (DS1) link. If these conditions are not represented in your network, it is recommended that you leave this value at the default setting.

# 1.4.2 Configuring OAM Cell Processing on a Switch Board

If you have enabled OAM cell processing on some ports on a switch board using the conf port aisrdi enable command, this command lets you override OAM cell transmission and reception on all ports on that switch board. (See Part 2 of the AMI Configuration Commands Reference Manual for more information about the conf port aisrdi command.) This command is useful if an errant node that is attached to one of the ports on your switch board is flooding your board with too many OAM cells.

When conf board oam disable is entered, the port level settings are still retained, but OAM cell processing ceases on all ports on that board. When conf board oam enable is entered, all ports on that board use their last port level settings again, so OAM cell processing starts again only on the ports on which it was last enabled.

myswitch::configuration board> oam <board> (enable | disable)

#### These parameters are defined as follows:

Parameter	Description
board	The number of the board on which OAM cell processing is being configured. Can be 1, 2, 3, or 4 for an ASX-1000 or a TNX-1100, with 1 being the leftmost slot. On all other switches, this number is always 1 because there is only one board in those switches.
enable   disable	Entering enable returns all ports on this board to their last port level settings for OAM cell processing before this functionality was disabled. Entering disable causes OAM cell processing to stop on all ports on this board, despite the conf port aisrdi settings. These settings are still retained. The default is disable.

All switches respond to OAM end-to-end loopback requests for originating/terminating VPTs. All switches also pass through OAM end-to-end loopback requests and responses that are received for VPCs and VCCs transparently.

ASX-1000s and TNX-1100s respond to all OAM segment loopback requests, while ASX-200BXs, ASX-200WGs, LE 155s, and TNX-210s only respond to OAM segment loopback requests received for originating/terminating VPTs. OAM segment loopback requests received for VPCs and VCCs are dropped by these types of switches. Also, the insertion of OAM loopback request cells is not supported.

## 1.4.3 Displaying the Board Configuration

This command shows the current configuration of the switch board (switch fabric). Enter the following parameters:

```
myswitch::configuration board> show
Board Model HW-Ver Mfg-Rev S/N NMs ATM/OAM
2 asx1000 0 D 4084 3 disabled
```

The fields in this display are defined as follows:

Field	Description
Board	The number of the slot in which the board (switch fabric) is installed.
Model	The type of switch this is.
HW-ver	The hardware version of this board.
Mfg-Rev	The manufacturing revision number.
S/N	The serial number of this switch board.
NMs	The number of network modules installed in this board.
ATM/OAM	Shows if OAM cell processing is enabled or disabled on this switch board. disabled means OAM cell processing is stopped on all ports on this board, despite the conf port aisrdi settings. enabled returns all ports on this board to their last conf port aisrdi settings before this functionality was disabled.

You can also display advanced information about a switch board. Enter the following:

Field	Description
Board	The number of the slot in which the board (switch fabric) is installed.
ClockScale	The factor by which the clock is scaled for traffic policing.
HDCOMPversion <sup>1</sup>	The version number of the HDCOMP ASIC on this switch board.

<sup>1.</sup> The HDCOMP ASIC must be version 1 or greater to support the AAL5 partial packet policing command under conf port pppolicing and to support changing the clockscale under conf board clockscale.

# 1.5 CEC Configuration

The cec commands let you configure the Timing Control Module (TCM) on a CEC-Plus. The CEC-Plus is an environmental/timing management subsystem. To display the cec commands, a TCM must be installed in the switch. You can display the list of available subcommands by typing? at the cec level.

# 1.5.1 Alarms Configuration Commands

This submenu lets you configure alarm conditions that are a result of various environmental and synchronization timing conditions. You can display the list of available subcommands by typing alarms? at the cec level.

```
myswitch::configuration cec> alarms ?
  disable    enable    relays>    show
```

## 1.5.1.1 Disabling an Alarm

This command lets you disable an alarm. Enter the following parameters:

```
myswitch::configuration cec alarms > disable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major   minor	Designates whether the alarm type causes a major alarm or a minor alarm when that condition occurs.
alarm type	Indicates the alarm condition. Valid parameters are displayed in the AlarmType field when the command string conf alarms show is entered.

For example, to disable an overtemperature condition that is detected by the overtemperature sensor as a minor alarm, enter the following parameters:

myswitch::configuration cec alarms> disable minor tempSensorOverTemp

To verify that the change has taken effect, you can display the alarms:

myswitch::configuration alarms>	show		
AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	active	disabled	enabled
powerSupplyOutputFailed	active	disabled	enabled
fanBankFailed	active	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
Major alarm relay status: on			
Minor alarm relay status: off			

## 1.5.1.2 Enabling an Alarm

This command lets you enable an alarm. Enter the following parameters:

```
myswitch::configuration cec alarms> enable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major   minor	Designates whether the alarm type causes a major alarm or a minor alarm when that condition occurs.
alarm type	Indicates the kind of alarm condition. Valid parameters are displayed in the AlarmType field when the command string conf alarms show is entered at the prompt.

For example, to enable an overtemperature condition that is detected by the overtemperature sensor as a major alarm, enter the following parameters:

```
myswitch::configuration cec alarms> enable major tempSensorOverTemp
```

To verify that the change has taken effect, you can display the alarms:

myswitch::configuration alarms>	show		
AlarmType	AlarmStatus	MinorAlarm	MajorAlarm
powerSupplyInputFailed	active	disabled	enabled
powerSupplyOutputFailed	active	disabled	enabled
fanBankFailed	active	disabled	enabled
tempSensorOverTemp	inactive	disabled	enabled
Major alarm relay status: on			
Minor alarm relay status: off			

## 1.5.1.3 Configuring an Alarm Relay

These commands let you configure or display alarm relays. You can show the list of available subcommands by typing relays? at the alarms level. Enter the following parameters:

#### 1.5.1.3.1 Setting an Alarm Relay

This command lets you set an alarm relay. Enter the following parameters:

```
myswitch::configuration cec alarms relays> set <relay number> (major | minor | unused)
```

These parameters are defined as follows:

Parameter	Description
relay number	Indicates the number which corresponds to one of the five alarm relay LEDs on the front of the SCP.
major minor   unused	Indicates if you want the alarm relay to be major, minor, or unused.

### 1.5.1.3.2 Displaying the Alarm Relays

This command lets you display the alarm relays. Enter the following parameters:

myswitch::	configuration cec	alarms relays>	show
Relay	Alarm	Current	
Number	Function	State	
1	major	on	
2	minor	on	
3	unused	off	
4	unused	off	
5	major	on	

The fields in this display are defined are defined as follows:

Field	Description
relay number	Shows the number which corresponds to one of the five alarm relay LEDs on the front of the SCP.
Alarm Function	Shows whether the alarm relay has been configured as major, minor, or unused.
Current State	Shows whether the alarm relay is on (in a state of alarm) or off (not in a state of alarm).

# 1.5.1.4 Displaying Alarm Conditions

This command lets you display the status of all alarms. Enter the following:

myswitch::configuration cec alarms> show AlarmType AlarmStatus MinorAlarm MajorAlarm powerSupplyInputFailed active disabled enabled powerSupplyOutputFailed active disabled enabled fanBankFailed active disabled enabled tempSensorOverTemp inactive disabled enabled Major alarm relay status: on Minor alarm relay status: off

Field	Description
AlarmType	Displays the name of the alarm.
AlarmStatus	Shows whether the state of the alarm is active (alarming) or inactive (not alarming). An alarm is active if the underlying condition is detected. For power supplies, the input failed alarm condition is active if the input voltage is not within the nominal range for the supply. This does not necessarily mean that an output failure will result. A power supply output failure condition is active if any power supply is failing or if it is physically removed.
MinorAlarm	disabled means that this alarm type will not cause a minor alarm. enabled means that this alarm type causes a minor alarm.
MajorAlarm	disabled means that this alarm type will not cause a major alarm. enabled means that this alarm type causes a major alarm.
Major Alarm relay status	off means that no major alarms are currently active. on means that one or more major alarms are currently active. Look at the AlarmStatus field to see which condition is in a state of alarm.
Minor Alarm relay status	off means that no minor alarms are currently active. on means that one or more minor alarms are currently active. Look at the AlarmStatus field to see which condition is in a state of alarm.

### 1.5.2 TCM Selection

The slotx and sloty submenus allow you to choose a TCM for further configuration. To configure parameters on the TCM in slot X (the top slot), type slotx at the cec level. To configure the TCM in slot Y (the bottom slot), type sloty at the cec level.

# 1.5.3 TCM Configuration Commands

Once an individual TCM has been selected for configuration, you can configure IP parameters, change the name of the TCM, display information about the TCM, and so on. You can display the list of available subcommands by typing? at the <code>slotx</code> or <code>sloty</code> sublevel. The commands for both levels are the same, but they are only described once with examples that read <code>slotx</code>.

## 1.5.3.1 IP Configuration Commands



The ie0 and ie1 interfaces of all installed TCMs and the ie0 interface of all installed SCPs must all reside on the same subnet.

These commands let you change the IP configuration of the TCM's interfaces. You can display the list of available subcommands by typing ip? at the configuration level.

```
myswitch::configuration cec slotx ip> ?
  address    admin    broadcast    mask
  route>    show
```

### 1.5.3.1.1 Configuring the IP Address

This command lets you configure an IP address for one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> address <interface> <address>
```

#### These parameters are defined as follows:

Parameter	Description	
interface	Indicates the name of the IP interface to be managed.	
address	Indicates the IP address for this interface.	

## 1.5.3.1.2 Configuring the IP State

This command lets you enable or disable the IP interfaces on the TCM. Enter the following parameters:

#### These parameters are defined as follows:

Parameter	Description	
interface	Indicates the name of the IP interface to be managed.	
up   down	Entering up enables the designated interface. Entering down disables the designated interface.	

### 1.5.3.1.3 Configuring the IP Broadcast Address

This command allows you to modify the broadcast address for one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> broadcast <interface> (0|1)
```

#### These parameters are defined as follows:

Parameter	Description	
interface	Indicates the name of the IP interface.	
0   1	Indicates the IP broadcast type for this interface. This is the host portion of the IP address that is used for routing. Entering 1 causes the host portion of the IP address to be set to all 1s. Entering 0 causes the host portion of the IP address to be set to all 0s.	

#### 1.5.3.1.4 Configuring the IP Subnet Mask

This command allows you to modify the IP subnet mask of one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> mask <interface> <mask>
```

These parameters are defined as follows:

Parameter	Description
interface	Indicates the name of the IP interface.
mask	Indicates the subnet mask for this IP interface. It should be entered in dotted decimal notation (e.g., 255.255.255.0).

#### 1.5.3.1.5 Configuring IP Routes

This command allows you to add a static IP route to the local IP routing table, delete a static IP route from the local IP routing table, or list the current static IP routes in the local IP routing table for one of the TCM's IP interfaces. You can display the list of available subcommands by typing route? at the ip level.

## 1.5.3.1.5.1 Adding an IP Route

This command lets you create an IP route for one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip route> new (default|<destination-ipaddress>)
<gateway> [<metric>] [(host | net)]
```

These parameters are defined as follows:

Parameter	Description
default	This parameter must be specified to create a default route.
destination-ipaddress	Indicates the destination IP network number.
gateway	Indicates the gateway address to the destination IP network number.
metric	Indicates the number of hops to the destination IP network. The default value of 1 is used if no value is entered. If 1 is specified, the route is created with the RTF_GATEWAY flag.
host   net	Using host indicates this is a host-specific route with the destination being a specific node's IP address. Using net indicates this is a network-specific route with the destination being a network IP address. The default value of net is used if no value is entered.

### 1.5.3.1.5.2 Deleting an IP Route

This command lets you delete an IP route from one of the TCM's IP interfaces. Enter the following parameters:

myswitch::configuration cec slotx ip route> delete (default|<destination-ipaddress>)
<qateway>

### These parameters are defined as follows:

Parameter	Description
default	A default must be specified to delete a default route.
destination-ipaddress	Indicates the destination IP network number.
gateway	Indicates the gateway address to the destination IP network number.

### 1.5.3.1.5.3 Showing the IP Routes

This command lets you display the current IP routes for the TCM's IP interfaces. Enter the following parameters:

myswitch::configuration cec slotx ip route> <b>show</b>				
Destination	Gateway	Metric	Interface	Flags
default	198.29.31.75	1	ie0	G
127.0.0.1	127.0.0.1	0	100	
169.144.85.3	198.29.31.75	1	ie0	G
198.29.31.0	198.29.31.28	0	ie0	

Field	Description	
Destination	Indicates the destination IP network number.	
Gateway	Indicates the gateway address to the destination IP network number.	
Metric	Shows the number of hops to the destination IP network. The default is 1	
Interface	Shows the local IP interface used to get to the destination IP network.	
Flags	Shows H if the route is host-specific (created with the RTF_HOST flag set). Shows G if the route is network-specific (created with the RTF_GATEWAY flag set).	

#### 1.5.3.1.6 Displaying the IP Interface Configuration

This command allows you to display information about the configuration of the TCM's IP interfaces. Enter the following parameters:

myswitch::configuration cec slotx ip> <b>show</b>				
interface	state	address	netmask	broadcast
ie0	up	169.144.28.125	255.255.255.0	169.144.28.255
ie1	up	169.144.28.225	255.255.255.0	169.144.28.255
100	up	127.0.0.1	255.0.0.0	N/A

The fields in this display are defined as follows:

Field	Description	
interface	Indicates the name of the IP interface.	
state	Lists the administrative state of the IP interface.	
address	Displays the IP address of the IP interface.	
netmask	Shows the netmask address of the IP interface.	
broadcast	Indicates the broadcast address of the IP interface.	

You may also designate a single interface to be displayed by entering **show** and the specific interface name at the prompt as follows:

```
myswitch::configuration cec slotx ip> show ie0
interface state address netmask broadcast
ie0 up 169.144.28.125 255.255.255.0 169.144.28.255
```

The fields in this display are defined in the same manner as those listed above in the example for showing the configuration of all of the IP interfaces.

## 1.5.3.2 Setting or Changing the TCM's Name

This command lets you set or change the name of the TCM. Enter the following parameters:

```
myswitch::configuration cec slotx> name <name>
```

This parameter is defined as follows:

Parameter	Description
name	Indicates the new system name for the TCM.

For example, to set the TCM's name to linus, enter the following parameters:

```
myswitch::configuration cec slotx> name linus
```

## 1.5.3.3 Serial Port Configuration

This command lets you display configuration information for the RS-232 serial port on the front panel of the TCM. You can display the available subcommand by typing? at the rs232 level.

```
myswitch::configuration cec slotx rs232> ?
   show
```

#### 1.5.3.3.1 Displaying Serial Port Information

This command allows you to display the settings for the RS-232 serial port on the TCM. Enter the following parameters:

```
myswitch::configuration cec slotx rs232> show
Port Type Speed Flow Bits Stops Parity
A rs232 9600 none 8 one none
```

The fields in this display are defined as follows:

Field	Description
Port	Shows the physical port designation.
Туре	Shows the signalling standard used.
Speed	Shows the receive/transmit rate in bits per second.
Flow	Shows the type of flow control implemented on the given port.
Bits	Shows the number of bit times in a single character.
Stops	Shows the number of stop bits in a character frame.
Parity	Shows the parity setting for the ports.

If no TCM is installed, then the following is displayed:

```
myswitch::configuration cec slotx rs232> show
No TCM found in this slot
```

## 1.5.3.4 Displaying TCM Information

This command lets you display information about the TCM to which you are logged in. Enter the following parameters:

```
myswitch::configuration cec slotx> show

TCM 'linus', Type cec-plus, up 0 days 18:15

Hardware version A, Software version S_ForeThought_5.2.0 (1.14891)

Serial number 30

Slot X

State active

Time zone

External Inputs (1-5) off off off off

Change to active operation occurred at Apr 16 17:16:56 1998

ESI module is present.
```

Field	Description
TCM	This TCM's system name.
Туре	Shows what type of TCM this is.
up	The amount of time (in days, hours, and minutes) since this TCM has been rebooted.
Hardware version	The hardware version of this TCM.
Software Version	The software version being used by this TCM.
Serial number	The serial number of this TCM card.
Slot	The slot in which this TCM resides. X indicates the top slot and Y indicates the bottom slot.
State	The current state of this TCM. active means this TCM is the controller and is functioning properly. standby means this is the standby TCM. offline means the timing has failed on this TCM.
Time zone	The time zone configured for this TCM. If this field reads $\mathbb{N}/\mathbb{A},$ then this value has not been configured yet.
External Inputs	The current state of each of the five front panel external inputs from the viewpoint of this TCM. Can be either on (input being received) or off (no input).
active   standby   offline	Shows when this TCM control software switched to the current operating mode.
ESI module	The External Synchronization Interface (ESI) card status from the viewpoint of this TCM. This should always be present. absent indicates a failure of the ESI interface logic.
Other TCM status	If another TCM is not plugged in, nothing is displayed. If another TCM is plugged in, shows the software status of the other TCM from the viewpoint of this TCM. If this TCM is the controller, normal means the standby TCM is actively updating and waiting to be called into service, and unknown means the standby TCM is down. If this TCM is the standby, active means the controller TCM is functioning normally.

## 1.5.3.5 SNMP Configuration Commands

These commands enable you to manage the SNMP communities and traps. You can display the list of available subcommands by typing snmp? at the configuration level.

```
myswitch::configuration cec slotx> snmp ?
trap>
```

### 1.5.3.5.1 Configuring SNMP Traps

These commands help you to manage SNMP traps. You can display the list of available sub-commands by typing trap? at the snmp level.

#### 1.5.3.5.1.1 Deleting an SNMP Trap Entry

This command allows you to delete an existing SNMP trap destination. Before deleting a trap that may need to be recreated later, show the list of current SNMP traps and either copy and save the screen or write down the trap destinations. You will also need to show the list of current SNMP traps in order to find the number of the trap to be deleted. Enter the following parameters to delete a trap entry:

```
myswitch::configuration cec slotx snmp trap> delete <trap>
```

The parameter for deleting is defined as follows:

Parameter	Description
trap	Indicates the number of the trap destination in the list of current SNMP traps that is to be removed.

For example, to delete trap 198.29.31.130, first list the traps to find its number and copy the address in case you want to recreate it later:

```
myswitch::configuration cec slotx snmp trap> show
Trap    Destination
1    192.88.243.18
2    198.29.16.14
3    198.29.216.18
4    198.29.23.39
5    198.29.31.130
```

#### Then enter the following parameters:

```
myswitch::configuration cec slotx snmp trap> delete 5
```

You can display the list again to verify that the trap has been deleted:

```
myswitch::configuration cec slotx snmp trap> show
Trap    Destination
1    192.88.243.18
2    198.29.16.14
3    198.29.16.18
4    198.29.23.39
```

#### 1.5.3.5.1.2 Creating an SNMP Trap Entry

This command allows you to specify a host to which an TCM can send SNMP traps. Enter the IP address of the SNMP trap destination to be added. Repeat this for as many SNMP trap destinations as needed. Traps are active as soon as they are set. Enter the following parameters:

```
myswitch::configuration cec slotx snmp trap> new <ipaddress>
```

The parameter for specifying is defined as follows:

Parameter	Description
ipaddress	Indicates the IP address of the trap destination to be created.

## 1.5.3.5.1.3 Displaying the SNMP Trap Entries

This command enables you to list all of the current SNMP traps. Enter the following:

```
myswitch::configuration cec slotx snmp trap> show
Trap     Destination
1     192.88.243.18
2     198.29.16.14
3     198.29.16.18
4     198.29.23.39
5     198.29.31.130
```

If no SNMP traps have been configured, the following message is displayed:

```
No trap information is available
```

## 1.5.3.6 Setting or Changing the Timezone

This command enables you to set or change the timezone on the TCM. Enter the following:

myswitch::configuration cec slotx> timezone <timezone>

The parameter for setting or changing is defined as follows:

Parameter	Description
timezone	The time zone configured for this TCM. The TCM supports and automatically converts from Standard to Daylight Savings time for the following time zones: EST5EDT (Eastern Standard Time), CST6CDT (Central Standard Time), MST7MDT (Mountain Standard Time), PST8PDT (Pacific Standard Time), AKST9AKDT (Alaska Standard Time).

Locations outside of the time zones listed above must supply the following POSIX standard 1003.1-1988 formula for switching between Daylight Savings Time and Standard Time:

stdoffset [dst[offset][, start[/time], end[/time]]]

The time zones have the following meanings:

Field	Description
std and dst	Indicates 3 or more bytes that designate standard (std) or Daylight Savings Time (dst). Only std is required; if dst is omitted, then it does not apply in this location. Can use uppercase or lowercase letters and any characters, except a leading colon(:), digits, comma (,), minus (-), plus (+), and ACSII NUL.
offset	Indicates the value to add to local time to equal Greenwich Mean Time. offset is of the form:  hh[:mm[:ss]]
	Hour (hh) is required and can be a single digit between 0 and 24. Minutes (mm) and seconds (ss) are optional and are between 0 and 59. If no offset follows dst, it is assumed to be one hour ahead of std. If preceded by a "-", the time zone is east of the Prime Meridian; otherwise it is west (with an optional "+")
start[/time], end[/time]	start indicates the date when the change occurs from std to dst. end indicates the date when you change back. Both start and end are of the form:
	Mm.n.d
	d is the d-th day $(0 \le d \le 6)$ of week n of month m of the year $(1 \le n \le 5, 1 \le m \le 12)$ , where week 5 is the last d day in month m, which can occur in either the fourth or the fifth week). Week 1 is the first week in which the d-th day occurs. Day 0 is Sunday. time is of the same format as offset, except that no leading "-" or "+" is allowed. If time is not entered, the default of $02:00:00$ is used.

# 1.5.4 CEC Timing Configuration

These commands let you configure external synchronization timing. Type timing? at the cec level to display the list of available subcommands.

```
myswitch::configuration cec> timing ?
bits> failover> mode primary
references revertive> secondary show
```

## 1.5.4.1 BITS Timing Configuration Commands

These commands let you configure the timing input and output for the BITS clock. You can display the list of available subcommands by entering bits? at the timing level. Enter the following:

```
myswitch::configuration cec timing> bits ?
  coding     framing     level
```

### 1.5.4.1.1 BITS Coding Configuration

This command lets you configure the coding of the DS1 BITS interface or the E1 BITS interface for this TCM. You can get to this level by entering coding at the bits level. Enter the following parameters:

```
myswitch::configuration cec timing bits> coding (ami | b8zs) for DS1 interface

Note: only hdb3 supported for E1 interface
```

The parameters for configuring are defined as follows:

Parameter	Description
ami	Indicates that Alternate Mark Inversion (AMI) coding should be used for the BITS interface on the TCM. This means zeros are represented by 01 during each bit cell, and ones are represented by 11 or 00, alternately, during each bit cell. This technique requires that the sending device maintain ones density. Ones density is not maintained independent of the data stream.
b8zs	Indicates that Binary 8-Zero Substitution (B8ZS) coding should be used for the TCM. This means a special code is substituted whenever eight consecutive zeros are sent through the link. This code is then interpreted at the remote end of the connection. This technique guarantees ones density independent of the data stream.
hdb3	Indicates that High Density Bipolar (HDB3) coding should be used for the TCM. HDB3 is a bipolar coding method that does not allow more than 3 consecutive zeroes.

### 1.5.4.1.2 BITS Framing Configuration

This command allows you to configure the framing format of the DS1 BITS interface or E1 BITS interface for this TCM. You can get to this level by entering framing at the bits level. Enter the following parameters:

```
myswitch::configuration cec timing bits> framing (d4 | esf) for DS1 interface or: framing (fas | fascrc4 | mfas | mfascrc4) for E1 interface
```

The parameters for configuring are defined as follows:

Parameter	Description
d4	Indicates that D4 (also known as Superframe (SF)) framing should be used for the BITS interface on the TCM. SF consists of 12 frames of 192 bits each, with the 193rd bit providing error checking and other functions.
esf	Indicates that Extended Superframe (ESF) framing should be used for the BITS interface on the TCM. ESF provides frame synchronization, cyclic redundancy, and data link bits.
fas	Indicates E1 framing that makes use of the Frame Alignment Signal.
fascrc4	Indicates E1 framing that makes use of the Frame Alignment Signal and CRC-4 checksums.
mfas	Indicates E1 framing that makes use of the Multi-Frame Alignment Signal (sometimes referred to as TS16).
mfascrc4	Indicates E1 framing that makes use of the Multi-Frame Alignment Signal and CRC-4 checksums.

#### 1.5.4.1.3 BITS Level Configuration

This command lets you configure the output level (dB) of the DS1 BITS interface for this TCM. This command is not valid when using an E1 source.

```
myswitch::configuration cec timing bits> level (0.6 | 1.2 | 1.8 | 2.4 | 3.0)
```

The parameters for configuring are defined as follows:

Parameter	Description
0.6	Indicates that the output level for the BITS interface is 0.6 dB.
1.2	Indicates that the output level for the BITS interface is 1.2 dB.
1.8	Indicates that the output level for the BITS interface is 1.8 dB.
2.4	Indicates that the output level for the BITS interface is 2.4 dB.
3.0	Indicates that the output level for the BITS interface is 3.0 dB.

## 1.5.4.2 Failover Timing Configuration

This command lets you configure the timing failover delay. You can display the available sub-command by typing failover? at the timing level.

```
myswitch::configuration cec timing> failover ?
  delay
```

### 1.5.4.2.1 Configuring the Failover Timing Delay

This command lets you set the delay, in whole seconds, between the time that the primary reference fails and the time that the TCM is told to switch over to the secondary reference. Enter the following parameters:

myswitch::configuration cec timing failover> delay <seconds>

The parameter for setting is defined as follows:

Parameter	Description
seconds	Indicates the amount of time after the failure of the primary reference before the TCM is instructed to switch to the secondary reference. The default is $\tt 0$ seconds.



The failover delay should be left at 0 under normal circumstances. This parameter is only meaningful when the timing mode is automatic.

## 1.5.4.3 Timing Mode Configuration

This command lets you configure the timing reference to be used on the TCM. You can get to this level by entering mode at the timing level. Enter the following parameters:

myswitch::configuration timing> mode (freerun | primary | secondary | automatic | bits)

The parameters for configuring are defined as follows:

Parameter	Description
freerun	Indicates that the TCM must use the local oscillator as its timing source.
primary	Indicates that the TCM must use the primary timing source.
secondary	Indicates that the TCM must use the secondary timing source.
automatic	This is the default mode. See the CEC-Plus Installation and User's Manual for a description of how this mode works.
bits	Indicates that the TCM will automatically use the most appropriate BITS input. See the <i>CEC-Plus Installation and User's Manual</i> for a description of how this mode works.



It is recommended that the freerun, primary, and secondary modes only be used during diagnostics and maintenance because the TCM will not failover to another source when it is in one of these modes.



automatic mode is only valid when the primary and secondary sources are recovered from network modules.

## 1.5.4.4 Primary Timing Configuration

This command enables you to select the primary clock source from any of the switch fabrics' exported clocks. Enter the following parameters:

myswitch::configuration cec timing> primary fabric (1 | 2 | 3 | 4) (primary | secondary)

The parameter for configuring is defined as follows:

Parameter	Description
fabric (1   2   3   4) (primary   secondary)	Indicates the primary timing source is to be taken from one of the exported clocks (either primary or secondary) from one of the switch fabrics (1 - first (leftmost slot), 2 - second slot, 3 - third slot, 4 fourth slot) switch fabric.

Before you configure the primary timing source, use the conf timing references command to display all of the possible clocking references, their specific sources, and whether or not they are actually available for you to use. The freerun oscillator is not listed there because it is always available.

## 1.5.4.5 Displaying Timing References

This commands lets you display all of the possible timing references from the switch. Enter the following parameters:

$\verb myswitch::configuration  \\$	cec timing>	references
Reference	Source	Status
fabric 1 primary	1A1	available
fabric 1 secondary	1B2	available
fabric 2 primary	2A1	available
fabric 2 secondary	2B2	available
fabric 3 primary	3A1	available
fabric 3 secondary	3B2	available
fabric 4 primary	4A1	available
fabric 4 secondary	4B2	available
tcm X	BITS1	available
tcm Y	BITS2	unavailable

The fields in this display are defined as follows:

Fields	Description
Reference	Shows the name of the timing reference.
Source	Shows from which network module port or BITS clock the timing is being derived for this fabric or TCM. If the port is listed in regular BNP notation (e.g., 3B2), this indicates the exported timing source from this port. If the port is listed as 3B (no timing), then this network module does not support distributed timing. If the port is listed as 3B OSC, this indicates the timing source is the crystal oscillator on that network module. If the port is listed as 3B (down), then this network module has been removed.
Status	Shows if the timing source is available or not.

If no TCM is installed, then the following is displayed:

```
myswitch::configuration cec timing> references
No ESI reference information available
```

## 1.5.4.6 Revertive Timing Configuration

These commands allow you to enable or to disable revertive switching, or to configure the length of the delay between the time that the failed primary clock is restored and the time that the TCM is told to switch back to the primary clock again. You can get to this level by entering revertive? at the timing level.



Revertive timing is only available when the mode is configured to be automatic under conf timing mode.

### 1.5.4.6.1 Configuring the Revertive Timing Delay

When revertive timing is enabled and the primary clock fails, the TCM is told of the failure and is instructed to switch to the timing source that is configured as the secondary clock. To ensure that the primary source is good when it returns, this command lets you configure the amount of time, in whole seconds, between the time that the primary clock is restored and the time that the TCM is told to switch back to the primary clock again. Enter the following parameters:

myswitch::configuration cec timing revertive> delay <seconds>

The parameter for configuring is defined as follows:

Parameter	Description
delay	Indicates the amount of time after the restoration of the primary timing reference before the TCM is instructed to return to the primary timing reference. The default is 3 seconds.

#### 1.5.4.6.2 Disabling Revertive Timing Delay

This command lets you disable the revertive switching for timing sources on this TCM. When you disable revertive switching, you only turn it off. If you enable it again, the TCM uses the value that you last configured for the delay using conf timing revertive delay. To disable the revertive timing delay, enter the following parameters:

myswitch::configuration cec timing revertive> disable

The parameter for disabling is defined as follows:

Parameter	Description				
disable	Indicates that the revertive timing delay is going to be turned off.				



This command takes effect as soon as you enter it.

#### 1.5.4.6.3 Enabling the Revertive Timing Delay

This command lets you enable the revertive switching delay for timing sources on this TCM. When you enable the delay, the TCM uses the value that you last configured for the delay using conf timing revertive delay. To enable the revertive timing delay, enter the following parameters:

myswitch::configuration cec timing revertive> enable

The parameter for enabling is defined as follows:

Parameter	Description
enable	Indicates that the revertive timing delay is going to be turned on.



This command takes effect as soon as you enter it.

## 1.5.4.7 Secondary Timing Configuration

This command enables you to select the secondary clock source from any of the switch fabrics' exported clocks. You can get to this level by entering **secondary** at the timing level. Enter the following parameters:

myswitch::configuration cec timing> secondary fabric (1 | 2 | 3 | 4) (primary|secondary)

The parameter for configuring is defined as follows:

Parameter	Description
fabric (1   2   3   4) (primary   secondary)	Indicates the secondary timing source is to be taken from one of the exported clocks (either primary or secondary) from one of the switch fabrics (1 - first (leftmost slot), 2 - second slot, 3 - third slot, 4 fourth slot) switch fabric.

Before you configure the secondary timing source, use the **conf timing references** command to display all of the possible clocking references, their specific sources, and whether or not they are actually available for you to use.

## 1.5.4.8 Displaying Timing

This command lets you display the timing information that has been configured. Enter the following parameters:

```
myswitch::configuration cec timing> show
ESI module on 'linus', Card type DS1 Stratum 4
DS1 BITS interface framing esf, line coding b8zs
output level 0.6 dB
PLL Status
                                       freerun
Current Timing Reference
                                       secondary
Requested Timing Reference
                                      secondary
Primary Reference (2D1)
                                      unavailable
Secondary Reference (2A1)
                                       unavailable
BITS1 Reference
                                       unavailable
BITS2 Reference
                                       unavailable
Revertive Switching
                                      enabled
Revertive Switching Delay
                                      10
Failover Switching Delay
                                       3
```

#### The fields in this display are defined as follows:

Field	Description
ESI module	Shows the name of the TCM.
Card type	Shows the ESI card type for this TCM.
DS1/E1 BITS interface framing	Shows the framing format of the BITS interface for this TCM. For DS1, can be: d4 or esf, and for E1, can be: fas, fascrc4, mfas, or mfascrc4.
line coding	Shows the coding format of the BITS interface for this TCM. For DS1, can be: ami or b8zs, and for E1, can be: hdb3.
output level	Shows the output level, in dB, of the DS1 BITS interface for this TCM. Can be 0.6, 1.2, 1.8, 2.4, or 3.0.
PLL Status	Shows the phase-locked loop (PLL) status for this TCM. Can be freerun meaning the local oscillator on the TCM is being used, locked meaning the current clock is good, holdover meaning the TCM has detected a clock source error and is using the last valid clock source, acquire meaning the TCM is trying to lock on to the current clock (this may take up to five minutes), or refqual meaning the reference quality of the new clock is out of specification.

Field	Description
Current Timing Reference	Shows the actual timing reference that is currently being used. Can be BITS1, BITS2, primary, secondary, or freerun.
Requested Timing Reference	Shows the timing reference that was configured. If this source fails, it will not match what is currently being used. Can be bits, automatic, primary, secondary, or freerun.
Primary Reference	Shows the timing source configured as the primary source. Can be one of the primary or secondary clocks exported from one of the switch fabrics.
Primary Status	Shows whether the timing source configured as the primary source is currently available or unavailable.
Secondary Reference	Shows the timing source configured as the secondary source. Can be one of the primary or secondary clocks exported from one of the switch fabrics.
Secondary Status	Shows whether the timing source configured as the secondary source is currently available or unavailable.
Revertive Switching	Shows whether revertive switching is enabled or disabled.
Revertive Switching Delay	Shows the amount of time, in seconds, between the time that the primary clock is restored and the time that the TCM switches back to the primary clock again.
Failover Switching Delay	Shows the amount of time, in seconds, after the failure of the primary clock source before the TCM switches to the secondary clock source.

## If no TCM is installed, then the following is displayed:

myswitch::configuration cec timing> show
No ESI board found

# 1.6 CES Configuration Command

The ces commands let the user create and delete CES connections, as well as display the status of existing connections. You can display the list of available subcommands by typing? at the ces level.



These commands are not available locally on an LE 155 switch.

# 1.6.1 Creating a New CES Connection

To create a new CES connection, you must configure several parameters. Enter the following to create a new CES connection:

```
myswitch::configuration ces> new <port> <timeslots>
```

The CES new command can also be used as shown below. When the following parameters are used, by default, an appropriate entry is made in the UPC table and a bidirectional PVC is created with the proper UPC index.

```
or: new <port> <timeslots> -oport <oport> -ots <ots>
or: new <port> <timeslots> -oport <oport> -ovpi <ovpi> -ovci <ovci>
```

The following are the advanced options that can be used when creating CES connections:

```
advanced options:
[-srts (on|off)] [-fupc <index>] [-bupc <index>]
[-cas (basic|cas)] [-partialfill <partialfill>] [-reassCDVT <cdvt>]
[-bufSize <bufSize>] [-integ <integ>]
```



SRTS is only available on unstructured connections, which are created by specifying all for the <timeslots> parameter.

The **-cas** and **-partialfill** options are not applicable to unstructured mode.

Structured mode is selected by indicating the exact timeslots to be used. For example, timeslots 1, 2, and 3 would be entered as 1-3, timeslots 2, 4, and 6 would be entered as 2:4:6, and combinations such as 1-4:9-11:12 are allowed.

The parameters for new are defined as follows:

Parameter	Description					
port	The port on which the CES connection is to be created.					
timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are being configured for a particular PVC. all indicates unstructured service. A time slot is a data path of size DS0 in a TD1 trunk. The time slot assignments may be either contiguous or non-contiguous DS0s.					
oport	The output port of the CES connection, which can be a CES port or an ATM port.					
ovpi	The output Virtual Path Identifier (VPI) of the CES connection when the output port is not a CES port.					
ovci	The output Virtual Channel Identifier (VCI) of the CES connection when the output port is not a CES port.					
ots	The output timeslots of the CES connection when the output port is a CES port.					
srts	Indicates whether Synchronous Residual Time Stamp (SRTS) clock recovery is to be enabled on this connection. on indicates that SRTS is enabled, off indicates that SRTS is disabled. The default is off.					
-fupc <index></index>	The UPC contract type to be used in the ingress direction of the connection. (See Part 2 of the AMI Configuration Commands Reference Manual for more information about UPC contracts.)					
-bupc <index></index>	The UPC contract type to be used in the egress direction of the connection. (See Part 2 of the AMI Configuration Commands Reference Manual for more information about UPC contracts.)					
cas	Indicates whether Channel Associated Signalling (CAS) is to be used on the connection. basic indicates that CAS will not be used, cas indicates that CAS will be used. The default is basic.					
partialfill	Indicates how many of the available 47 payload bytes in each cell are used before they are deemed "full" and ready for transmission across the ATM network (i.e., how much of the ATM cell contains data and how much is filler). The range for this parameter is 5 to 47. The default value is 47, for 47 bytes of data. partialfill is used to minimize network transmission latency and is useful especially with time-sensitive, robbed-bit signalling sources.					

Parameter	Description
-reassCDVT <cdvt></cdvt>	The Cell Delay Variation Tolerance for cells being received by the segmentation and reassembly (SAR) engine. The range for this parameter is 100 to 24000 (in $\mu$ s), and the default is 2000 (i.e., 2 ms).
bufSize	The amount of reassembly buffer space allocated for the connection. The default is 512 bytes per timeslot.
integ	The amount of time allocated to re-establish the connection before, while, or after the call is established, or in the case of interruption. The default is 2500 $\mu$ s.

# 1.6.2 Deleting a CES Connection

To delete a CES connection, enter the following parameters:

myswitch::configuration ces> delete <service>

The parameter for delete is defined as follows:

Parameter	Description
service	The CES service ID of the connection to be deleted.

# 1.6.3 Displaying CES Connections

To display the current CES connections, enter the following:

myswitch::configuration ces> show
Searching For CES ports.....

CES		Input					Outr	out		
Service	State	Port	Timeslots	VPI	VCI	Type	Port	TimeSlots	VPI	VCI
24	down	1A1	1	0	129	-	-	-	-	-
31	down	1A1	2-3	0	130	spvc	1D3	-	0	32
32	down	1A1	4-5	0	131	pvc	1D4	=	0	150
33	down	1A1	6-7	0	132	spvc	1D3	_	0	35

The fields in this display are defined as follows:

Field	Description
CES Service	The identification number (assigned by the switch) of this CES connection.
State	Indicates whether the CES connection is enabled (up) or disabled (down).
Input Port	The incoming port on which the CES connection exists.
Timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are configured for the input port. all indicates unstructured service.
Input VPI	The incoming VPI value of the connection.
Input VCI	The incoming VCI value of the connection.
Type	The type of ATM connection (i.e., PVC or SPVC) that is associated with the CES connection.
Output Port	The outgoing port on which the CES connection exists.
Timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are configured for the output port. all indicates unstructured service.
Output VPI	The outgoing VPI value of the connection.
Output VCI	The outgoing VCI value of the connection.

To display the advanced settings of the current CES connections, enter the following:

## The fields in this display are defined as follows:

Field	Description
CES Service	The identification number (assigned by the switch) of this CES connection.
MapVPI	The incoming VPI value of the connection.
MapVCI	The incoming VCI value of the connection.
Service Type	Shows if this connection uses structured or unstructured service.
Clock Mode	Synch means that the connection is in synchronous mode (either structured or unstructured). SRTS means that the connection is in asynchronous (unstructured) mode. (Synchronous Residual Time Stamp (SRTS) clock recovery is enabled on this connection.)
Cas	basic indicates that Channel Associated Signalling (CAS) will not be used, cas indicates that CAS will be used.
Partial Fill	Indicates how many of the available 47 payload bytes in each cell are used before they are deemed "full" and ready for transmission across the ATM network (i.e., how much of the ATM cell contains data and how much is filler). The range for this parameter is 5 to 47. The default value is 47, for 47 bytes of data. partialfill is used to minimize network transmission latency and is useful especially with time-sensitive, robbed-bit signalling sources.
Max BufSize	The amount of reassembly buffer space allocated for the connection. The default is 512 bytes per timeslot.
CDVT	The Cell Delay Variation Tolerance for cells being received by the segmentation and reassembly (SAR) engine. The range for this parameter is 100 to 24000 (in $\mu$ s), and the default is 2000 (i.e., 2 ms).
Integ. Period	The amount of time allocated to re-establish the connection before, while, or after the call is established, or in the case of interruption. The default is $2500\mu s$ .

## If no CES network modules are installed, then the following is displayed:

```
myswitch::configuration ces> show
Searching For CES ports.....
No services found
```

# 1.7 Frame Relay Configuration Commands

These commands let you configure Frame Relay services and PVCs on a *FramePlus* network module. Type ? at the fratm level to display the available subcommands.

# 1.7.1 Deleting a Frame Relay Service

This command lets you delete a Frame Relay service. Enter the following:

```
myswitch::configuration fratm> delete <serviceId>
```

For example, to delete a service, enter something similar to the following:

```
myswitch::configuration fratm> del 2A1:00
```

The parameter for delete is defined as follows:

Parameter		Description
	serviceId	The ID of the Frame Relay service to be deleted. Look under the SvcId field under conf fratm show to find this number.



Before you can delete a service, you must delete all connections that are using that service. To see how many connections are using a particular service, look at the Vccs field under stats fratm service.

# 1.7.2 Creating a Frame Relay Service

This command lets you create a Frame Relay service. Enter the following:



You must either use the default Frame Relay profiles or create new ones using the conf profile commands and then create the Frame Relay services using this command. Then, you can create a Frame Relay PVC using the conf fratm pvc commands. See Appendix D in the Network Configuration manual for your switch for more information about this process.



Timeslots should be entered in one of the following formats: Timeslots 1, 2, and 3 should be entered as 1-3. Timeslots 2, 4, and 6 should be entered as 2:4:6. Combinations such as 1-4:9-11:13 are allowed. Unchannelized connections should be entered as all (this means 1-24 for DS1 and 1-31 for E1).

If you wish to use multiple timeslots, you must ensure that the access rate of the referenced service profile is large enough to support them. The default access rate is 64 Kbps. To verify the access rate, look in the accrate field under conf profile service. If the rate is 64, you can only use a single timeslot. If it says 128 Kbps, you can use two timeslots. If it says 1536 Kbps, you can use 24 timeslots, etc.

For example, to create a Frame Relay service, enter something similar to the following:

myswitch::configuration fratm> new 1a1 1 -lmi 3 -service 2 -name service\_a
The newly created service id is 1A1:00

As shown above, the switch responds with a service ID, which can be referenced in other AMI commands that prompt for a <serviceid> such as conf fratm pvc new.

The parameters for new are defined as follows:

Parameter	Description
port	The port on which the Frame Relay service is to be created.
timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are being configured for this service. all indicates unchannelized connections. The time slot assignments must match the access rate specification in the service profile. (Look in the accRate field under conf profile service.) The access rate for one timeslot is 64 Kbps, and the access rate for two timeslots is 128 Kbps, etc.
lmi <index></index>	The lmi profile that is to be used with this service. Look under the Index field under conf profile lmi show to find this number.
service <index></index>	The service profile that is to be used with this service. Look under the Index field under conf profile service show to find this number.
egress_re (enabled   disabled)	Enables or disables egress rate enforcement for this service. It ensures that frames leaving on the WAN interface do not violate any traffic contract defined for a particular connection being supported by this service. Because the traffic is managed at a connection level, the rate enforcement algorithm uses the values of the outBc, outBe, and outCir arguments within the connection's frrate profile. (See those respective fields under conf profile frrate show.) enabled means rate enforcement is active. disabled means rate enforcement is not active. The default value is disabled.
status (enabled   disabled)	Sets the administrative status of this service. enabled means it is up. disabled means it is down. The default value is enabled.
name <name></name>	The optional, user-assigned name for this service.

# 1.7.3 Configuring Frame Relay PVCs

These commands let you configure Frame Relay PVCs. Type? at the pvc level to display the available subcommands.

# 1.7.3.1 Deleting a Frame Relay PVC

This command lets you delete a Frame Relay PVC. Enter the following:

```
myswitch::configuration fratm pvc> delete <serviceId> <dlci>
```

For example, to delete a Frame Relay PVC, enter something similar to the following:

```
myswitch::configuration fratm pvc> del 4a1:01 101
```

### 1.7.3.2 Creating a Frame Relay PVC

This command lets you create a Frame Relay PVC.



You must either use the default Frame Relay profiles or create new ones using the conf profile commands and then create the Frame Relay services using the conf fratm new command. Then, you can create a Frame Relay PVC using this command. See Appendix D in the Network Configuration manual for your switch for more information about this process.



Currently, the *FramePlus* network module does not permit the establishment of Frame-to-Frame connections across a single fabric. This restriction prevents connections between FramePlus ports located on the same network module, or *FramePlus* ports located across separate modules, but attached to the same switch fabric.

### Enter the following:

```
myswitch::configuration fratm pvc> new <serviceid> <dlci> [-oport <oport>] [-ovpi <ovpi>]
        [-ovci <ovci>] [-faupc <index>] [-afupc <index>] [-epdppd <index>]
        [-status (enabled|disabled)] [-frrate <index>] [-frf8 <index>]
        [-name <name>]
```

note: if oport/ovpi/ovci aren't specified, a dangling FRATM PVC will be created.

## The parameters for delete and new are defined as follows:

Parameter	Description
serviceId	The ID of the service to be used by this PVC. Look in the SvcId field under conf fratm show to find this number.
dlci	The Data Link Connection Identifier used to identify this Frame Relay PVC.
oport	The output port for this Frame Relay PVC, which is an ATM port.
ovpi	The output Virtual Path Identifier (VPI) of this Frame Relay PVC.
ovci	The output Virtual Channel Identifier (VCI) of this Frame Relay PVC.
faupc <index></index>	The UPC traffic contract that is to be used for this PVC. Look under the Index field under conf upc show to find this number. This contract is applied to the connection in the Frame Relay to ATM direction.
afupc <index></index>	The UPC traffic contract that is to be used for this PVC. Look under the Index field under conf upc show to find this number. This contract is applied to the connection in the ATM to Frame Relay direction.
epdppd <index></index>	The EPD/PPD profile that is to be used for this PVC. Look under the Index field under conf profile epdppd show to find this number.
status (enabled   disabled)	Changes the administrative status of this PVC. enabled means it is up. disabled means it is down. The default value is enabled.
frrate <index></index>	The Frame Relay rate profile that is to be used for this PVC. Look under the Index field under conf profile frrate show to find this number.
frf8 <index></index>	The FRE8 profile that is to be used for this PVC. Look under the Index field under conf profile frf8 show to find this number.
name <name></name>	The optional, user-assigned name for this PVC.

## 1.7.3.3 Changing the Status of a Frame Relay PVC

This command lets you configure the administrative status of a particular Frame Relay PVC on a *FramePlus* network module to be up or down. Enter the following:

```
myswitch::configuration fratm pvc> admin <serviceid> <dlci> (up | down)
```

#### These parameters are defined as follows:

Parameter	Description
serviceid	The ID of the Frame Relay PVC whose administrative status needs to be changed. The ID number can be found in the SvcId field under conf fratm pvc show.
dlci	The Data Link Connection Identifier that indicates the particular Frame Relay PVC whose administrative status needs to be changed. The DLCI can be found in the dlci field under conf fratm pvc show.
up   down	up sets the administrative status of the designated PVC to up (enabled). down sets the administrative status of the designated PVC to down (disabled).

## 1.7.3.4 Setting Ingress Rate Enforcement on a Frame Relay PVC

This command lets you enable or disable ingress rate enforcement on an existing Frame Relay PVC on a *FramePlus* network module. Enter the following:

```
myswitch::configuration fratm pvc> ingress_re <serviceid> <dlci> (enabled|disabled)
```

### These parameters are defined as follows:

Parameter	Description
serviceid	The ID of the Frame Relay service. The ID number can be found in the SvcId field under conf fratm pvc show.
dlci	The Data Link Connection Identifier that indicates the particular Frame Relay PVC that is to be configured. The DLCI can be found in the dlci field under conf fratm pvc show.
disabled   enabled	enabled means ingress rate enforcement is used on this Frame Relay PVC. disabled means standard ingress rate enforcement is not used on this Frame Relay PVC. The default is disabled.

## 1.7.3.5 Displaying Frame Relay PVC Information

This command lets you display information about Frame Relay PVCs. Enter the following:

myswitch	yswitch::configuration fratm pvc> <b>show</b>												
		Input			Outpu	ıt							
SvcId	dlci	Port	VPI	VCI	Port	VPI	VCI	State	Epd	Frr	Frf8	IngRE	Name
4A1:00	40	4A1	0	32	4C1	0	40	up	0	0	0	dis	pvc_a
4A1:00	40	4C1	0	40	4A1	0	32	up	0	0	0	dis	pvc_a
4A1:01	41	4A1	16	32	4C1	0	41	up	0	0	0	enb	pvc_b
4A1:01	41	4C1	0	41	4A1	16	32	up	0	0	0	enb	pvc_b
4A1:02	42	4A1	32	32	4C1	0	42	up	0	0	0	dis	pvc_c
4A1:02	42	4C1	0	42	4A1	32	32	up	0	0	0	dis	pvc_c

The fields in this display are defined as follows:

Field	Description
SvcId	The ID of the service that is used by this PVC.
dlci	The Data Link Connection Identifier used to identify this Frame Relay PVC.
Input Port	The input port of the Frame Relay PVC.
Input VPI	The input Virtual Path Identifier (VPI) of the Frame Relay PVC.
Input VCI	The input Virtual Channel Identifier (VCI) of the Frame Relay PVC.
Output Port	The output port of the Frame Relay PVC.
Output VPI	The output Virtual Path Identifier (VPI) of the Frame Relay PVC.
Output VCI	The output Virtual Channel Identifier (VCI) of the Frame Relay PVC.
State <sup>1</sup>	The administrative state of this PVC. up means it is enabled. down means it is disabled.
Epd	The index of the EPD/PPD profile that is used by this PVC.
Frr	The index of the Frame Relay rate profile that is used by this PVC.
Frf8	The index of the FRF.8 profile that is used by this PVC.
IngRE	dis (disabled) means standard ingress rate enforcement is not used by this Frame Relay PVC. enb (enabled) means ingress rate enforcement is used by this Frame Relay PVC.
Name	The user-assigned name for this PVC.

<sup>1.</sup> The admin state or status under the conf port iwf ds1/e1, conf fratm, conf fratm pvc, conf funi and conf funi pvc levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under conf fratm pvc is administered down, the corresponding admin state of the service under conf fratm is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

You can also display information about a particular service as follows:

The fields in this display are defined in the same manner as those in the previous example.

You can display information about a particular service and DLCI as follows:

```
      myswitch::configuration fratm pvc> show 4a1:01 41

      Input
      Output

      SvcId dlci Port VPI VCI
      Port VPI VCI State
      Epd Frr Frf8 IngRE Name

      4A1:01
      41
      4A1
      16
      32
      4C1
      0
      41
      up
      0
      0
      0
      dis pvc_b

      4A1:01
      41
      4C1
      0
      41
      4A1
      16
      32
      up
      0
      0
      0
      dis pvc_b
```

The fields in this display are defined in the same manner as those in the previous example.

You can also display advanced information as follows:

```
myswitch::configuration fratm pvc> show advanced
SvcId dlci afupc faupc
4A1:00  40   0   0
4A1:01  41   0   0
4A1:02  42   0   0
```

The fields in this display are defined as follows:

Field	Description
SvcId	The ID of the service that is used by this PVC.
dlci	The Data Link Connection Identifier used to identify this Frame Relay PVC.
afupc	The UPC traffic contract that is used on this PVC in the ATM to Frame Relay direction.
faupc	The UPC traffic contract that is used on this PVC in the Frame Relay to ATM direction.

If no *FramePlus* network modules are installed, or if there are no Frame Relay PVCs configured, then the following is displayed:

```
myswitch::configuration fratm pvc> show
No FR/ATM VCC information available
```

# 1.7.4 Changing the Status of a Frame Relay Service

This command lets you configure the administrative status of a particular Frame Relay service on a *FramePlus* network module to be up or down. Enter the following:

myswitch::configuration fratm> admin <serviceid> (up | down)

These parameters are defined as follows:

Parameter	Description
serviceid	The Frame Relay service whose administrative status needs to be changed. The ID number can be found in the SvcId field under conf fratm show.
up   down	up changes the administrative status of the designated service to up (enabled). down changes the administrative status of the designated service to down (disabled).

# 1.7.5 Configuring Egress Rate Enforcement on a FR Service

This command enables you to to enable or disable egress rate enforcement on an existing Frame Relay service. Enter the following:

myswitch::configuration fratm> egress\_re <serviceid> (enabled|disabled)

These parameters are defined as follows:

Parameter	Description
serviceid	The Frame Relay service that is to be configured. The ID number can be found in the SvcId field under conf fratm show.
enabled   disabled	Changes the status of egress rate enforcement for this service. It ensures that frames leaving on the WAN interface do not violate any traffic contract defined for a particular connection being supported within this service. Because the traffic is managed at a connection level, the rate enforcement algorithm is determined by the values of the outBc, outBe, and outCir arguments within the connection's frrate profile. (See those respective fields under conf profile frrate show) enabled means rate enforcement is active. disabled means rate enforcement is not active. The default value is disabled.

# 1.7.6 Enabling and Disabling FR Service Statistics

This command allows you to enable or disable the collection of statistics on an existing Frame Relay service.



To collect Frame Relay statistics, they must be enabled both here <u>and</u> at the network module level under <u>conf module fram stats</u>. By default, they are disabled here, but enabled at the module level.

### Enter the following:

myswitch::configuration fratm> stats <serviceid> (enabled|disabled)

#### These parameters are defined as follows:

Parameter	Description
serviceid	The Frame Relay service that is to be configured. The ID number can be found in the SvcId field under conf fratm show.
enabled   disabled	enabled means statistics are collected on the designated service. disabled means statistics are not collected on the designated service. The default is disabled.

# 1.7.7 Enabling and Disabling FR Service Traps

This command allows you to to enable or disable the SNMP service UP and DOWN traps on an existing Frame Relay service. Enter the following:

```
myswitch::configuration fratm> trap <serviceid> (enabled|disabled)
```

#### These parameters are defined as follows:

Parameter	Description
serviceid	The Frame Relay service that is to be configured. The ID number can be found in the SvcId field under conf fratm show.
enabled   disabled	enabled means SNMP UP and DOWN traps are operational on the designated service. disabled means SNMP UP and DOWN traps are not operational on the designated service.

## 1.7.8 Displaying Frame Relay Service Information

To display information about the current Frame Relay services, enter the following:

myswitch::configuration fratm> show Searching for FR-ATM services SvcId TimeSlt Admin EgressRE Lmi Serv Traps Stats Name 4A1:00 1 disabled 0 enabled disabled service\_a 4A1:01 2 disabled 0 0 enabled disabled service\_b up 4A1:02 3 disabled 0 enabled disabled service c uр

The fields in this display are defined as follows:

Field	Description
SvcId	The ID for this service.
TimeSlt	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are configured for this service. all indicates unchannelized connections. The time slot assignments must match the access rate specification in the service profile.
Admin <sup>1</sup>	The administrative status of this service. up means it is enabled. down means it is disabled.
EgressRE	The status of egress rate enforcement on this service. enabled means it is on. disabled means it is off.
Lmi	The index of the LMI profile that is used by this service.
Serv	The index of the service profile that is used by this service.
Traps	enabled means SNMP traps are being generated for this service. disabled SNMP traps are not being generated for this service.
Stats	enabled means statistics are being collected for this service. disabled statistics are not being collected for this service.
Name	The optional, user-assigned name for this service.

<sup>1.</sup> The admin state or status under the conf port iwf ds1/e1, conf fratm, conf fratm pvc, conf funi and conf funi pvc levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under conf fratm pvc is administered down, the corresponding admin state of the service under conf fratm is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

#### AMI Configuration Commands

You can also display information about a particular service as follows:

```
myswitch::configuration fratm> show [<serviceId>]
myswitch::configuration fratm> show 4a1:00

Searching for FR-ATM services
SvcId TimeSlt Admin EgressRE Lmi Serv Traps Stats Name
4A1:00 1 up disabled 0 0 enabled disabled service_a
```

The fields in this display are defined in the same manner as those in the previous example.

If no *FramePlus* network modules are installed or if no services are configured, then the following is displayed:

```
myswitch::configuration fratm> show
Searching for FR-ATM services
....No services found
```

# 1.8 FUNI Configuration Commands

These commands let you configure FUNI services. Type ? at the funi level to display the available subcommands.

# 1.8.1 Deleting a FUNI Service

This command lets you delete a FUNI service. Enter the following parameters:

myswitch::configuration funi> delete <serviceId>

For example, to delete a FUNI service, enter something similar to the following:

myswitch::configuration funi> del 2A1:00

The parameter for delete is defined as follows:

Parameter	Description
serviceId	The ID of the FUNI service to be deleted. Look in the SvcId field under conf funi show to find this number.



Before you can delete a service, you must delete all connections that are using that service. To see how many connections are using a particular service, look at the Vccs field under stats funi service.

## 1.8.2 Creating a FUNI Service

This command lets you create a FUNI service. Enter the following:



You must either use the default profiles or create FUNI profiles using the conf profile commands and then create the FUNI services using this command. Then, you can create a FUNI PVC using the conf funi pvc commands. See Appendix D in the Network Configuration manual for your switch for more information about this process.



Timeslots should be entered in one of the following formats: Timeslots 1, 2, and 3 should be entered as 1-3. Timeslots 2, 4, and 6 should be entered as 2:4:6. Combinations such as 1-4:9-11:13 are allowed. Unchannelized connections should be entered as all (this means 1-24 for DS1 and 1-31 for E1).

If you wish to use multiple timeslots, you must ensure that the access rate of the referenced service profile is large enough to support them. The default access rate is 64 Kbps. To verify the access rate, look in the accrate field under conf profile service. If the rate is 64, you can only use a single timeslot. If it says 128 Kbps, you can use two timeslots. If it says 1536 Kbps, you can use 24 timeslots, etc.

For example, to create a FUNI service, enter something similar to the following:

```
myswitch::configuration funi> new 4a1 1 -funi 1 -name service_a
The newly created service id is 4A1:00
```

As shown above, the switch responds with a service ID, which can be referenced in other AMI commands that prompt for a *serviceid* such as **conf funi pvc new**.

## The parameters for new are defined as follows:

Parameter	Description
port	The port on which the FUNI service is to be created.
timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are being configured for this service. all indicates unchannelized connections. The time slot assignments must match the access rate specification in the service profile. (Look in the accrate field under conf profile service.) The access rate for one timeslot is 64 Kbps, and the access rate for two timeslots is 128 Kbps, etc.
funi <index></index>	The FUNI profile that is to be used for this service. Look under the Index field under conf profile funi show to find this number.
service <index></index>	The generic service profile that is to be used for this service. Look under the Index field under conf profile service show to find this number.
status (enabled   disabled)	Sets the administrative status of this service. enabled means it is up. disabled means it is down.
name <name></name>	The optional, user-assigned name for this service.

## 1.8.3 Configuring FUNI PVCs

This command lets you configure FUNI PVCs. Type ? at the pvc level to display the available subcommands.

## 1.8.3.1 Deleting a FUNI PVC

This command lets you delete a FUNI PVC. Enter the following:

```
myswitch::configuration funi pvc> delete <serviceId> <fvpi> <fvci>
```

For example, to delete a FUNI PVC, enter something similar to the following:

```
myswitch::configuration funi pvc> del 4d1:01 0 44
```

### 1.8.3.2 Creating a FUNI PVC

This command lets you create a FUNI PVC. Enter the following:



You must first create any profiles that you want using the conf profile commands and then create the FUNI services using the conf funi new command. Then, you can create a FUNI PVC using this command. See Appendix D in the Network Configuration manual for your switch for more information about this process.

```
myswitch::configuration funi pvc> new <serviceid> <fvpi> <fvci> [-oport <oport>]
[-ovpi <ovpi>] [-ovci <ovci>] [-faupc <index>] [-afupc <index>] [-epdppd <index>]
[-status (enabled|disabled)] [-name <name>]
```

note: if oport/ovpi/ovci aren't specified, a dangling FRATM PVC will be created.

For example, to create a FUNI PVC, enter something similar to the following:

```
myswitch::configuration funi pvc> new 4A1:00 0 40 -oport 4C1 -fvpi 0 -fvci 40 -name pvc_a
```

## The parameters for delete and new are defined as follows:

Parameter	Description
serviceId	The ID of the service to be used by this PVC. Look under the SvcId field under conffuni show to find this number.
fvpi	The Virtual Path Identifier (VPI) of the FUNI PVC. This number must be within the range specified by the FUNI profile that is associated with the service used. The number of active bits is displayed in the #bits Vpi field under conf profile funi show.
fvci	The Virtual Channel Identifier (VCI) of the FUNI PVC. This number must be within the range specified by the FUNI profile that is associated with the service used. The range is displayed in the vci Min and vci Max fields under conf profile funi show.
oport	The output port of the FUNI PVC.
ovpi	The output Virtual Path Identifier (VPI) of the FUNI PVC on the ATM side.
ovci	The output Virtual Channel Identifier (VCI) of the FUNI PVC ATM.
faupc <index></index>	The UPC traffic contract that is to be used for this PVC. Look under the Index field under conf upc show to find this number. This contract is applied to the PVC in the FUNI to ATM direction.
afupc <index></index>	The UPC traffic contract that is to be used for this PVC. Look under the Index field under conf upc show to find this number. This contract is applied to the PVC in the ATM to FUNI direction.
epdppd <index></index>	The EPD/PPD profile that is to be used for this PVC. Look under the Index field under conf profile epdppd show to find this number.
status (enabled   disabled)	Changes the administrative status of this PVC. enabled means it is up. disabled means it is down. The default value is enabled.
name <name></name>	The optional, user-assigned name for this connection.

## 1.8.3.3 Changing the Status of a FUNI PVC

This command enables you to configure the administrative status of a particular FUNI PVC on a *FramePlus* network module to be up or down. Enter the following:

myswitch::configuration funi pvc> admin <serviceid> <fvpi> <fvci> (up|down)

### These parameters are defined as follows:

Parameter	Description
serviceid	The ID of the FUNI service. The ID number can be found in the SvcId field under conf funi pvc show.
fvpi	The Virtual Path Identifier (VPI) of the FUNI PVC.
fvci	The Virtual Channel Identifier (VCI) of the FUNI PVC.
up   down	up sets the administrative status of the designated service to up (enabled). down sets the administrative status of the designated service to down (disabled).

## 1.8.3.4 Displaying FUNI PVC Information

This command lets you display information about FUNI PVCs. Enter the following:

myswitch::configuration funi pvc> show FUNI FUNI Input SvcId VPT VCI Port VPI VCI Port VPI VCI Status Eppd Name 4A1:02 42 4A1 32 42 4C1 0 42 0 pvc\_c 4A1:02 42 4C1 0 0 42 4A1 32 42 0 pvc\_c up 4A1:00 40 4A1 4C1 40 up 0 pvc\_a 4A1:00 40 4C1 0 40 4A1 0 40 0 pvc\_a up 4A1:01 41 4A1 16 41 4C1 0 41 0 pvc\_b up 4A1:01 41 4C1 41 16 0 pvc\_b 0 4A1 41 up

The fields in this display are defined as follows:

Field	Description
SvcId	The ID of the service used by this PVC.
FUNI VPI	The Virtual Path Identifier (VPI) of the PVC on the FUNI side that you entered for $\langle fvpi \rangle$ . This value may or may not be used by the switch software. The value that is actually used is displayed in the Input VPI field.
FUNI VCI	The Virtual Channel Identifier (VCI) of the PVC on the FUNI side that you entered for $\langle fvci \rangle$ . This value may or may not be used by the switch software. The value that is actually used is displayed in the Input VCI field.
Input Port	The input port of the PVC on the FUNI side.
Input VPI	The input Virtual Path Identifier (VPI) of the FUNI PVC that is selected and used by the switch software. This value may or may not be what you entered for $\langle fvpi \rangle$ .
Input VCI	The input Virtual Channel Identifier (VCI) of the FUNI PVC that is selected and used by the switch software. This value may or may not be what you entered for $$ .
Output Port	The output port of the PVC on the ATM side.
Output VPI	The output Virtual Path Identifier (VPI) of the PVC on the ATM side.
Output VCI	The output Virtual Channel Identifier (VCI) of the PVC on the ATM side.
Status <sup>1</sup>	The administrative status of this PVC. enabled means it is up. disabled means it is down.
Eppd	The EPD/PPD profile that is used by this PVC.
Name	The user-assigned name for this PVC.

<sup>1.</sup> The admin state or status under the conf port iwf ds1/e1, conf fratm, conf fratm pvc, conf funi and conf funi pvc levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under conf fratm pvc is administered down, the corresponding admin state of the service under conf fratm is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

You can also display information about a particular service as follows:

The fields in this display are defined in the same manner as those in the previous example.

You can display information about a particular service, fvpi, and fvci as follows:

```
        myswitch::configuration funi pvc> show 4a1:02 0 42

        FUNI FUNI Input
        Output

        SvcId
        VPI VCI Port VPI VCI Port VPI VCI Status Eppd Name

        4A1:02
        0 42
        4A1 32 42 4C1 0 42 up 0 pvc_c

        4A1:02
        0 42 4C1 0 42 4A1 32 42 up 0 pvc_c
```

The fields in this display are defined in the same manner as those in the previous example. You can also display advanced information as follows:

```
myswitch::configuration funi pvc> show advanced
SvcId fvpi fvci afupc faupc
4A1:00     0     40     0     0
4A1:01     0     41     0     0
4A1:02     0     42     0     0
```

The fields in this display are defined as follows:

Field	Description
SvcId	The ID of the service that is used by this PVC.
fvpi	The Virtual Path Identifier (VPI) of the FUNI PVC on the FUNI side.
fvci	The Virtual Channel Identifier (VCI) of the FUNI PVC on the FUNI side.
afupc	The UPC traffic contract that is used on this PVC in the ATM to Frame Relay direction.
faupc	The UPC traffic contract that is used on this PVC in the Frame Relay to ATM direction.

If no FramePlus network modules are installed or if no FUNI PVCs are configured, then the following is displayed:

```
myswitch::configuration funi pvc> show
No FUNI VCC information available
```

# 1.8.4 Configuring the Administrative Status of a FUNI Service

This command enables you to configure the administrative status of a particular FUNI service on a *FramePlus* network module to be up or down. Enter the following:

myswitch::configuration funi> admin <serviceid> (up | down)

These parameters are defined as follows:

Parameter	Description
serviceid	The FUNI service whose administrative status needs to be changed. The ID number can be found in the SvcId field under conf funi show.
up   down	up changes the administrative status of the designated service to up (enabled). down changes the administrative status of the designated service to down (disabled).

# 1.8.5 Enabling and Disabling FUNI Service Statistics

This command allows you to enable or disable the collection of statistics on an existing FUNI service.



To collect FUNI statistics, you must enable them both here <u>and</u> at the network module level under <u>conf module fram stats</u>. They are disabled here, but enabled at the module level by default.

Enter the following:

myswitch::configuration funi> stats <serviceid> (enabled|disabled)

These parameters are defined as follows:

Parameter	Description
serviceid	The FUNI service that is to be configured. The ID number can be found in the SvcId field under conf funi show.
enabled   disabled	enabled means statistics are collected on the designated service. disabled means statistics are not collected on the designated service. When statistics are disabled, the counters show zeros. The default is disabled.

# 1.8.6 Enabling and Disabling FUNI Service Traps

This command allows you to to enable or disable the SNMP service UP and DOWN traps on an existing FUNI service. Enter the following:

myswitch::configuration funi> trap <serviceid> (enabled|disabled)

These parameters are defined as follows:

Parameter	Description
serviceid	The FUNI service that is to be configured. The ID number can be found in the SvcId field under conf funi show.
enabled   disabled	enabled means SNMP UP and DOWN traps are operational on the designated service. disabled means SNMP UP and DOWN traps are not operational on the designated service.

## 1.8.7 Displaying FUNI Service Information

To display information about the current FUNI services, enter the following:

```
myswitch::configuration funi> show
Searching for FUNI services
 SvcId TimeSlot
                   Admin Funi Serv Signal
                                            Traps
                                                     Stats
                                                               Name
 4A1:00 1
                            1
                                 0 nonexist enabled disabled service_a
 4A1:01 2
                            0
                                 1 nonexist enabled disabled service_b
                   up
 4A1:02 3
                                 O nonexist enabled disabled service c
                   uρ
```

The fields in this display are defined as follows:

Field	Description
SvcId	The ID for this service.
Timeslot	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are being configured for this service. all indicates unchannelized connections. The time slot assignments must match the access rate specification in the service profile.
Admin <sup>1</sup>	The administrative status of this service. up means it is enabled. down means it is disabled.
Funi	The index of the FUNI profile that is to be used by this service.
Serv	The index of the service profile that is to be used by this service.
Signal	This is a read-only field that indicates whether or not there exists a FUNI signalling instance that is associated with this FUNI service.
Trap	enabled means SNMP traps are being generated for this service. disabled SNMP traps are not being generated for this service.
Stats	enabled means statistics are being collected for this service. disabled statistics are not being collected for this service.
Name	The user-assigned name for this service.

<sup>1.</sup> The admin state or status under the conf port iwf ds1/e1, conf fratm, conf fratm pvc, conf funi and conf funi pvc levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under conf fratm pvc is administered down, the corresponding admin state under conf fratm is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

If no *FramePlus* network modules are installed or if FUNI services have not been configured, then the following is displayed:

```
myswitch::configuration funi> show
Searching for FUNI services
....No services found
```

# 1.9 ILMI SNMP Proxy Configuration Commands

These commands let you configure the ILMI SNMP Proxy (ISP) table. Through this table, you can discover the topology of the network to which your switch is connected because your switch registers its address via ILMI (if ILMI is running on each switch) with its neighboring switches. You can add, delete, or display ISP table entries and you can send SNMP requests to the ISP table. Type <code>ilmiproxy</code>? at the <code>configuration</code> level to display the available subcommands.

## 1.9.1 Deleting an ISP Table Entry

This command lets you delete an entry from the ISP table. Enter the following parameters:

```
myswitch::configuration ilmiproxy> delete <port> <vpi> <index>
```

For example, to delete an entry from the table, enter something similar to the following:

```
myswitch::configuration ilmiproxy> del 1a2 0 19
```

## 1.9.2 Resending an ILMI SNMP Proxy Request

This command allows you to resend an ILMI SNMP proxy request. Enter the following parameters:

```
myswitch::configuration ilmiproxy> go <port> <vpi> <index>
```

For example, to resend a request, enter something similar to the following:

```
myswitch::configuration ilmiproxy> go lal 0 6
```

# 1.9.3 Creating an ISP Table Entry

This command lets you create an ISP table entry and send the request. Enter the following parameters:

myswitch::configuration ilmiproxy> new <port> <vpi> <index> (get | gnext) <oid> <comm>
(doOnce | doEveryIlmiRestart)



Your request will fail if ILMI is down on the path that you entered. First, use the command conf signalling show so that you can quickly see on which ports ILMI is up.

For example, before creating an entry, first check on which ports ILMI is up by entering the following:

```
myswitch::configuration signalling> show
 Port VPI Interface
                        SigVersion State ILMI Side
                                                     RemoteAddress
1C1
       0 privateUNI(a) uni30(a) down down network
       0 privateUNI
                       uni31
                                           network 172.19.12.140
                                  up
                                        up
1C3
       0 PNNI(a)
                       pnni10(a) up
                                             network 172.19.12.57
 1C4
       0 PNNI
                       pnni10
                                             network 169.144.64.58
                                  up
 1CTL
       0 privateUNI(a) uni30(a)
                                  up
                                        down network
```

Then type the parameters to create the entry as follows:

```
myswitch::configuration ilmiproxy> new 1c2 0 get .1.3.6.1.2.1.1.4.0 public doOnce
```

The parameters for delete, go, and new are defined as follows:

Parameter	Description
port	The port number of the ISP table entry.
vpi	The VPI of the ISP table entry.
index	The unique index number of the ISP table entry.
get   getnext	get means the SNMP request you are creating is a get, which searches for the object that you are requesting. gnext means the SNMP request you are creating is a getnext, which searches for the next greatest entry in the MIB after the object that you specify.
oid	The object identifier (OID) for the SNMP request that you want to get or getnext.
comm	The SNMP community string to use.
doOnce	The SNMP request is to be performed only once.
doEveryIlmiRestart	The SNMP request is to be performed each time that ILMI restarts on the specified path.

## 1.9.4 Displaying the ISP Table Entries

This command lets you display the current ISP table entries. Enter the following parameters:

```
myswitch::configuration ilmiproxy> show
ISP Entry Port 1A1 Vpi 0 Index 3
______
          .1.3.6.1.2.1.1.2.0
         .1.3.6.1.2.1.1.2.0
Rsp_Oid
Operation
         get
Community
         private
When to do
         do0nce
Value
         OID:.1.3.6.1.4.1.326.2.2
Operation Status success
______
ISP Entry Port 1A1 Vpi 0 Index 12
_____
Req_Oid
          .1.3.6.1.4.1.326.2.1.1.1.1.16.0
Rsp_Oid
         N/A
Operation
         get
Community
         private
When to do
         doOnce
Value
         N/A
Operation Status failure
______
ISP Entry Port 1A1 Vpi 0 Index 15
______
Reg Oid
         .1.3.6.1.2.1.1.1.0
Rsp_Oid
         .1.3.6.1.2.1.1.1.0
Operation
         get
         public
Community
When to do
         do0nce
Value
         FORE Systems ASX-200BX
Operation Status success
______
Press return for more, q to quit: q
```

#### The fields in this display are defined as follows:

Field	Description
Req_Oid	The object identifier (OID) for the SNMP request that you sent.
Rsp_Oid	The OID in the response to the SNMP request. It is valid only if the operation status is success.
Operation	get means the SNMP request is a get, which searches for the OID that you requested. gnext means the SNMP request is a getnext, which searches for the next greatest entry in the MIB after the specified OID.
Community	The SNMP community string being used. The default is public.
When to do	doOnce means that the SNMP request is performed only once. doEveryIlmirestart means that the SNMP request is to be performed each time that ILMI comes up on the specified path.
Value	The value returned by the get or the getnext. This is valid only if the operation status is success
Operation Status	The current status of this SNMP query. Idle means the request has not been made yet. inProgress means the request has been made, but has not been completed yet. Success means the request has been made and completed successfully. Failure means the request has been made, but was not successful. Failures can occur because either there was no response from the peer (the request timed out), or there was an error message from the peer (like a NOSUCHNAME error), or the ILMI/UNI/link on which to send this request is down.

# You can also display an individual ISP table entry. Enter the following:

```
myswitch::configuration ilmiproxy> show [<port> [<vpi> [<index>]]]
myswitch::configuration ilmiproxy> show 1a1 0 15
ISP Entry Port 1A1 Vpi 0 Index 15
Req_Oid
              .1.3.6.1.2.1.1.1.0
Rsp_Oid
              .1.3.6.1.2.1.1.1.0
Operation
              get
Community
              public
When to do
              do0nce
Value
               FORE Systems ASX-200BXTNX-210
Operation Status success
```

# If there are no current entries in the ISP table, then the following is displayed:

```
myswitch::configuration ilmiproxy> show
ISP information not available
```

# 1.10 IP Configuration Commands

These commands let you change the IP configuration. You can display the list of available sub-commands by typing ip ? at the configuration level.

# 1.10.1 Configuring the IP Address

This command allows you to configure the IP address of each of the switch's IP interfaces. Enter the following parameters:



On a new switch, the ie0, asx0, qaa0, qaa1, qaa2, qaa3 interfaces are NOT configured. An IP address must be configured for at least one of the interfaces to allow IP access to the switch, which, in turn, enables SNMP access. By setting the IP address of the asx0 interface or one of the qaa interfaces, in-band (over ATM) access to the switch control processor (SCP) is enabled. By setting the IP address of the ie0 interface, out-of-band access to the SCP is enabled.



On an ASX-1000 or a TNX-1100, the IP addresses must be configured individually on each SCP.

myswitch::configuration ip> address <interface> <address> [<netmask>] [(up)]

### These parameters are defined as follows:

Parameter	Description
interface	The name of the IP interface to be managed. Valid interfaces are: ie0 (the Ethernet interface), asx0 (the switch's SPANS interface), qaa0, qaa1, qaa2, qaa3 (the Classical IP interfaces), lo0 (the switch's local interface that allows AMI to run), and el0, el1,etc. (the LAN Emulation interfaces).
address	The IP address for this interface. The state of the interface must be up before setting the address. This can be changed using confip admin.
netmask	The subnet mask for this IP interface. It should be entered in dotted decimal notation (e.g., 255.255.255.0). If you accidentally enter a duplicate address for the same subnet as an existing one, the switch rejects the duplicate and prints an error message.
up	Entering up brings the designated interface on-line as soon as you enter this command.

# 1.10.2 Configuring the IP State

This command allows you to change the state of the IP interface to up or down. Enter the following parameters:

myswitch::configuration ip> admin <interface> (up | down)

### These parameters are defined as follows:

Parameter	Description	
interface <sup>1</sup>	The name of the IP interface to be managed. Valid interfaces are: ie0 and asx0.	
address	up brings the designated interface on-line. down takes the interface off-line. If you enter conf ip admin el all down, you can bring down all of the el interfaces at once. Similarly, entering conf ip admin el all up brings up all of the el interfaces at once.	

 $<sup>^{1.}</sup>$  The switch's local interface, 100, must  $\underline{always}$  be up to allow AMI to run on the switch.

# 1.10.3 Configuring the IP Broadcast Address

This command lets you modify the broadcast address for an IP interface. Enter the following:

```
myswitch::configuration ip> broadcast <interface> (0 | 1)
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the IP interface to be managed. Valid interfaces are: ie0, asx0, and any of the el interfaces.
0   1	The IP broadcast type for this interface. This is the host portion of the IP address that is used for routing. 1 causes the host portion of the IP address to be set to all 1s. 0 causes the host portion of the IP address to be set to all 0s.

# 1.10.4 Configuring IP Forwarding

This command allows you to turn IP forwarding on or off. If IP forwarding is turned off, the switch will not forward (i.e., route) IP packets from one IP interface to another IP interface. Enter the following parameters:

```
myswitch::configuration ip> forwarding (on off)
```

These parameters are defined as follows:

Parameter	Description
on   off	Using on turns IP forwarding on. Using off turns IP forwarding off. The default is off.

# 1.10.5 Configuring the IP Subnet Mask

This command allows you to modify the IP subnet mask. Enter the following parameters:

```
myswitch::configuration ip> mask <interface> <mask>
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the IP interface. Valid interfaces are: ie0, asx0, qaa0, qaa1, qaa2, and qaa3.
mask	The subnet mask for this IP interface. It should be entered in dotted decimal notation (e.g., 255.255.255.0).

# 1.10.6 Configuring the MTU Size of a Classical IP Interface

This command allows you to configure the MTU size of a Classical IP interface. Although the default MTU size should work in most installations, you may need to modify this value when connected to non-FORE equipment. Enter the following parameters:

myswitch::configuration ip> mtu <qaaX> <size>

#### These parameters are defined as follows:

Parameter	Description	
qaaX	The name of the Classical IP interface. Valid interfaces are: qaa0, qaa1, qaa2, and qaa3.	
size	The MTU size for this Classical IP interface. Valid values are from 1 to 32767. The default is 9180.	

# 1.10.7 Configuring IP Routes

This command allows you to add a static IP route to the local IP routing table, delete a static IP route from the local IP routing table, or list the current static IP routes in the local IP routing table. You can display the list of available subcommands by typing route? at the ip level.

#### 1.10.7.1 Adding an IP Route

This command lets you create an IP route. Enter the following parameters:

```
myswitch::configuration ip route> new (default | <destination-ipaddress>) <gateway>
[<metric>] [(host | net)]
```

## 1.10.7.2 Deleting an IP Route

This command lets you delete an IP route. Enter the following parameters:

```
myswitch::configuration ip route> delete (default | <destination-ipaddress>) <qateway>
```

These parameters for new and delete are defined as follows:

Parameter	Description
default	This parameter must be entered to create a default route.
destination-ipaddress	The destination IP network number.
gateway	The gateway address to the destination IP network number.
metric	The number of hops to the destination IP network. If 1 is specified, the route is created with the RTF_GATEWAY flag set. The default is 1.
host   net	host means this is a host-specific route with the destination being a specific node's IP address. net means this is a network-specific route with the destination being a network IP address. The default is net.

## 1.10.7.3 Showing the IP Routes

This command lets you display the current IP routes. Enter the following parameters:

myswitch::configuration ip route> show Destination Gateway Metric Interface Flags default 169.144.48.1 le0 169.144.48.0 169.144.48.21 0 le0 169.144.60.0 169.144.60.21 asx0 169.144.64.0 169.144.64.21 0 qaa0 169.144.200.0 169.144.200.21 el0 169.144.204.0 169.144.204.21 0 el1 169.144.205.0 169.144.205.21 el2 169.144.206.0 169.144.206.21 el3

The fields in this display are defined as follows:

Field	Description
Destination	The destination IP network.
Gateway	The gateway address to the destination IP network number.
Metric	The number of hops to the destination IP network. The default is 1.
Interface	The local IP interface used to get to the destination IP network.
Flags	H means the route is host-specific (created with the RTF_HOST flag set). G means the route is network-specific (created with the RTF_GATEWAY flag set).

# 1.10.8 Displaying the IP Interface Configuration

This command allows you to display information about the configuration of the IP interfaces. Enter the following parameters:

myswitch::	configuration	ip> show			
interface	state	address	netmask	broadcast	mtu
100	up	127.0.0.1	255.0.0.0	N/A	4096
ie0	up	169.144.229.45	255.255.255.0	169.144.229.255	1500
asx0	down				
qaa0	up	169.144.230.45	255.255.255.0	N/A	9180
qaa1	down				
qaa2	down				
qaa3	down				

IP Forwarding State: not-forwarding

The fields in this display are defined as follows:

Field	Description
interface	The name of the IP interface.
state	The administrative state of the IP interface.
address	The IP address of the IP interface.
netmask	The netmask address of the IP interface.
broadcast	The broadcast address of the IP interface.
mtu	The MTU size of the IP interface. Only the Classical IP interfaces (qaa0, qaa1, qaa2, and qaa3) have a configurable MTU size.

You may also designate a single interface to be displayed by entering **show** and the specific interface name at the prompt as follows:

```
myswitch::configuration ip> show ie0
interface state address netmask broadcast mtu
ie0 up 169.144.229.45 255.255.255.0 169.144.229.255 1500

IP Forwarding State: not-forwarding
```

The fields in this display are defined in the same manner as those listed above in the example for showing the configuration of all of the IP interfaces.

# 1.10.9 Unconfiguring an IP Interface

This command lets you unconfigure an IP interface. This process removes the IP address associated with the interface. Enter the following parameters:

myswitch::configuration ip> unconfigure <interface>

#### This parameter is defined as follows:

Parameter	Description
interface	The name of the IP interface to be unconfigured. Valid interfaces are: ie0, asx0, qaa0, qaa1, qaa2, and qaa3.

You will be asked to confirm this action. To confirm the action, type y at the prompt. To cancel the action, type n or press res at the prompt. For example:

myswitch::configuration ip> unconfigure qaal

Unconfiguring an interface requires the switch to be rebooted. Continue with unconfigure [n]?  $\mathbf{y}$ 

Reboot the switch [y]? y



The switch must be rebooted for this command to take effect.

AMI Configuration Commands

# 1.11 LAN Emulation Configuration Commands

These commands allow you to configure LAN Emulation (LANE) on a switch. You can display the list of available subcommands by typing? at the lane level.

# 1.11.1 Default LANE Configuration Commands

These commands let you configure a default ELAN. You can display the list of available sub-commands by typing? at the default level.

## 1.11.1.1 Creating a Default ELAN

This command lets you create a simple default ELAN. You can use this command only if you do not already have an ELAN named default. This command creates and starts an ELAN named default that consists of an LECS, a co-located LES/BUS, and a single LEC. This ELAN uses the ATM Forum well-known address for the LECS. It is an Ethernet ELAN with an MTU size of 1516, and it has ELAN access control disabled and TLV registration enabled.



You must create a LECS configuration file using conf lane lecs new and put it on the switch that is to be the LECS using conf lane lecs get <host>:<remotefile>[<localfile>].



You must assign an IP address to the el0 interface for the LEC using conf ip address and make the LEC operational by using conf ip admin <interface>up.



You cannot use DLE with this ELAN unless you delete the ELAN and recreate it using the conflane les command so that you can assign the DLE peer server addresses.

#### Enter the following parameters:

```
myswitch::configuration lane default> new
Do you want to create default ELAN (LES/BUS, LECS, LEC): [n]? y
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** creates a new ELAN named default. If you enter **y**, you receive the following message when the ELAN is created.

Created LANE Services and a LEC for the default ELAN.

If an ELAN named default already exists, you will receive an error message.

#### 1.11.1.2 Deleting a Default ELAN

This command lets you delete the ELAN named default. This command will delete the ELAN named default that was started using the conflane default new command.



If the ELAN named default was started using the other conf lane commands and the -les option was specified under conf lane lecs new, then this command will delete that ELAN named default, as well.

### Enter the following parameters:

```
myswitch::configuration lane default> delete
Do you really want to delete the ELAN named default (LES/BUS, LECS, LEC): [n]? y
```

Entering n or pressing <ENTER> aborts the command. Entering y deletes the ELAN named default. If no ELAN named default exists, you receive the following message when you enter y.

```
myswitch::configuration lane default> delete
Do you really want to delete the ELAN named default (LES/BUS, LECS, LEC): [n]? y
Default LANE is not configured.
```

### 1.11.1.3 Displaying a Default ELAN

This command lets you show information for the ELAN named default. Enter the following:

```
myswitch::configuration lane default> show
LECS Information:
Index AdminStatus OperStatus Selector WKA
                                               Database
                                    0xf1 atm-forum
                                                   lecs.cfg
       Default LES: 0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
LES/BUS Information:
Index AdminStatus OperStatus LesSel Type
                                             MTU
                                                   ELAN
                                                            SECURE TLVs
                            0xf0
                                   ethernet
                                             1516 default disable enable
       LES : 0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
       BUS: 0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0 (Co-Located)
LEC Information:
       Admin Oper
 Index Status Status Sel
                             Mode
                                       MACaddress
                                                     IfName
                                                               ELAN
                       0x00 wellknown 0620481a3596 el0
                                                               default
    1 up
       LECS: 0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
       LES :0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
```

The fields in this display are defined as follows:

Field	Description
LECS Information:	
Index	The unique index number of the LECS that identifies it from other LECSs. This number is dynamically assigned by the switch when the LECS is created.
AdminStatus	Reflects any changes that you have made to the status of the LECS. up means you have started the LECS. down means you have stopped the LECS.
OperStatus	Reflects the actual current status of the LECS. up means the LECS is currently active. down means the LECS is currently inactive.
Selector	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the switch that is running the LECS.
WKA	The state of the well-known address for this particular LECS. atm-forum means the LECS is using the default address as defined by the ATM Forum. This is the default value. none means the well-known address has been disabled. other means the well-known address has been redefined, in which case the new address appears on the following line.
Database	The full path to the location and name of the LECS database file. The default is lecs.cfg.
Default LES	The default LES address to use in case the LECS configuration file is inaccessible. If a default LES address has not been specified, this field is not displayed.
LES/BUS Information:	
Index	The unique index number of the LES that identifies it from other LESs. This number is dynamically assigned by the switch when the LES is created.

Field	Description
AdminStatus	Reflects any changes that you have made to the status of the LES. up means you have started the LES. down means you have stopped the LES.
OperStatus	Reflects the actual current status of the LES. up means the LES is currently active. down means the LES is currently inactive.
LesSel	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the switch that is the LES.
Туре	ethernet means the LAN type is Ethernet. token-ring means the LAN type is Token Ring.
MTU	The maximum data frame size. Can be 1516, 1580, 4544, 9234, or 18190. The default for Ethernet is 1516. The default for Token Ring is 4544.
ELAN	The name of the ELAN that this LES services.
SECURE	enable means that ELAN access control is running. disable means that ELAN access control is not running.
TLVs	enable means the LES accepts TLV parameters from LEC/MPCs that register with it and distributes these TLVs to LEC/MPCs in response to LE-ARP queries. disable means the LES collects TLV parameters from LEC/MPCs that register with it, but does not distribute these TLVs to LEC/MPCs in response to LE-ARP queries.
LES:	The full ATM address of the LES. The LECs that wish to join this ELAN use this address to contact the LES.
BUS:	The full ATM address of the BUS for this ELAN.
LEC Information:	
Index	The unique index that identifies this LEC. It is dynamically assigned by the switch when the LEC is created.
AdminStatus	Reflects any changes that you have made to the status of the LEC. up means you have started the LEC. down means you have stopped the LEC.
OperStatus	Reflects the actual current status of the LEC. up means the LEC is currently active. down means the LEC is currently inactive. joining means that the LEC is in the process of registering with the ELAN.
Sel	The selector byte portion (20th byte) of the ATM address of the LEC in hexadecimal format.
Mode	The configuration mode that is used when a LEC joins the ELAN. wellknown means that the "well-known" LECS address and the default LES are used. manual means that the specified LECS or LES address is used. The default is wellknown.
MACaddress	The Ethernet MAC address for this LEC.
IfName	The el interface name of this LEC.
ELAN	The name of the ELAN to which this LEC belongs.

### If there is no ELAN named default, you receive the following message:

myswitch::configuration lane default> show
Default LANE is not configured.

# 1.11.2 BUS Configuration Commands

These commands allow you to configure a Broadcast and Unknown Server (BUS) for an ELAN. You can display the list of available subcommands by typing? at the bus level.



ForeThought 5.0 and greater versions do not allow you to create a BUS separately from a LES. Therefore, the commands in this menu are only useful in providing backwards compatibility with switches that are running earlier versions of ForeThought software.

## 1.11.2.1 Configuring the BUS Administrative Status

This command lets you change the administrative status of a BUS to up (start a BUS service) or down (stop a BUS service). Enter the following parameters:

myswitch::configuration lane bus> admin <BUS index | BUS index range (x-y)> (up | down)

## 1.11.2.2 Deleting a BUS

This command allows you to delete a specified BUS. Enter the following parameters:

myswitch::configuration lane bus> **delete** <BUS index | BUS index range (x-y)>

The parameters for admin and delete are defined as follows:

Parameter	Description
BUS index	The unique, positive integer index of the BUS that is dynamically assigned by AMI when a BUS is created to identify this service from any other service in the same class. Found under the Index field using the conf lane bus show command.
BUS index range (x-y)	The range of index numbers of the BUSs that you want to start or stop. The index is found under the Index field using conf lane bus show.
up down	up changes the administrative status of the designated BUS index to up. down changes the administrative status of the designated BUS index to down.

## 1.11.2.3 Creating a BUS

This command lets you create a BUS for an ELAN. Enter the following parameters:

The parameters for new are defined as follows:

Parameter	Description
BUS Selector byte	The 20th byte of the ATM address of the switch that is to run a BUS service (entered in hexadecimal format). Use conf atmarp getnsap to display the entire ATM address.
BUS name	The name for this BUS. Identifies which ELAN this BUS services.
type	ethernet means that the LAN type is Ethernet. token-ring means that the LAN type is Token Ring. The default is ethernet.
mtu <sup>1</sup>	Indicates which maximum transmission unit (MTU) size you wish to use. Valid values are: 1516, 4544, 9234, and 18190. Defaults are 1516 for Ethernet and 4544 for Token Ring.

 $<sup>^{1.}</sup>$  The MTU size must match the MTU size of the other hosts and edge devices on the ELAN.

### 1.11.2.4 Displaying BUS Information

This command lets you display the current BUS information. To display information about every BUS that is currently configured on the switch, enter the following parameters:

myswitc	h::configurat	ion lane bus>	show			
Index	AdminStatus	OperStatus	Selector	Type	MTU	ELAN
1	up	up	0x12	ethernet	1516	one
2	un	un	0~32	token-ring	4544	three

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this BUS. It is dynamically assigned by AMI when the BUS is created.
AdminStatus	Reflects any changes that you have made to the status of the BUS. Up means you have started the BUS. Down means you have stopped the BUS.
OperStatus <sup>1</sup>	Reflects the actual current status of the BUS. Up means the BUS is currently active. Down means the BUS is currently inactive.
Selector	The selector byte portion (20th byte) of the ATM address of the host or switch that is the BUS in hexadecimal format
Туре	The type of ELAN this is. ethernet means that the LAN type is Ethernet. token-ring means that the LAN type is Token Ring
MTU	The maximum transmission unit (MTU) size.
ELAN	The name of the ELAN that this BUS services.

<sup>1.</sup> When you change the administrative status of a BUS from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the information above to show the AdminStatus as up, but the OperStatus as down. If you refresh the display, the change will have taken place and be reflected here.

To display information about a particular BUS that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane bus> show [<BUS index>]
```

For example, to display information about the BUS with an index number of 1, enter the following parameters:

```
myswitch::configuration lane bus> show 1
Index AdminStatus OperStatus Selector Type MTU ELAN
    1 up up 0x12 ethernet 1516 one
```

The fields in this display are defined in the same manner as those in the previous example.

## 1.11.3 LAN Emulation Client (LEC) Configuration Commands

These commands let you configure the LAN Emulation Client (LEC). You can display the list of available subcommands by typing lec? at the lane level.

```
myswitch::configuration lane> lec ?
admin arp> delete default>
new show
```

### 1.11.3.1 Configuring the LEC Administrative Status

This command lets you change the administrative status of a LEC to up (start a LEC) or down (stop a LEC). Enter the following parameters:

```
myswitch::configuration lane lec> admin < LEC index | LEC index range (x-y)> (up \mid down)
```

The parameters for admin are defined as follows:

Parameter	Description
LEC index	The unique, positive integer index of the LEC that is dynamically assigned by AMI when a LEC is created to identify this LEC from any others in the same ELAN. Found under the Index field using the conf lane lec show command.
LEC index range (x-y)	The range of index numbers of the LECs that you want to start or stop. The index is found under the Index field using conf lane lec show.
up   down	Entering up starts this LEC. Entering down stops this existing LEC. The default is up.

### 1.11.3.2 Configuring LANE ARP Commands

These commands let you configure the LANE ARP cache. You can reach this level by entering arp at the lec level. Enter the following parameters to list the various ARP commands:

#### 1.11.3.2.1 Deleting LANE ARP Cache Information

This command allows you to remove an ARP entry from the LANE ARP cache or to delete the contents of the LANE ARP cache. Enter the following parameters:

```
myswitch::configuration lane lec arp> delete (all | <MAC address>)
```

These parameters are defined as follows:

Parameter	Description	
all	Indicates that all of the entries are to be flushed from the LANE ARP cache.	
MAC address	Indicates the specific entry that is to be flushed from the LANE ARP cache.	

#### 1.11.3.2.2 Displaying LANE ARP Cache Information

This command displays the current LANE ARP cache. The MAC address-to-ATM address mapping information for each LEC is stored here. Enter the following parameters:

```
myswitch::configuration lane lec arp> show [(advanced)]
```

By entering **show** without the **advanced** option, the basic LANE ARP cache information is displayed as follows:

```
myswitch::configuration lane lec arp> show

MacAddress AtmAddress ELAN
0020481a00d5 0x47.0005.80.ffe100.0000.f21a.00d5.0020481a00d5.0b eng_net
```

By entering **show** with the **advanced** option, more LANE ARP cache information, including the VPI/VCI combination and any flags associated with this entry, is displayed as follows:

If the LANE ARP cache is empty, then the following message is displayed.

```
No LANE ARP entries are available.
```

### 1.11.3.3 Deleting a LEC

This command lets you delete a LEC from an ELAN. Enter the following parameters:

```
myswitch::configuration lane lec> delete < LEC index | LEC index range (x-y)>
```

The parameters for delete are defined as follows:

Parameter	Description
LEC index	The unique, positive integer index of the LEC that is dynamically assigned by AMI when a LEC is created to identify this LEC from any others in the same ELAN. The index is found under the Index field using the conf lane lec show command.
LEC index range (x-y)	The range of index numbers of the LECs that you want to delete. The index is found under the Index field using conf lane lec show.



Before you can delete a LEC, you must first administer its el interface down using the confip admin <interface> down command.

## 1.11.3.4 LEC Default Configuration Mode Commands

These commands allow you to set or to display the default LEC configuration mode. You can show the list of available subcommands by typing default? at the lec level.

#### 1.11.3.4.1 Setting the Default LEC Configuration Mode

This command lets you set the default mode for configuring all of the ELANs that may be created on this switch.



If you use manual mode, you must specify the LECS address of the machine that will be used as the LECS. If you use wellknown mode, then the "well-known" LECS address is used.

#### Enter the following parameters:

myswitch::configuration lane lec default> mode (manual | wellknown) [<LECS address>]

LECS address is required for manual mode.

#### These parameters are defined as follows:

Parameter	Description
manual   wellknown	manual means the LECS address specified here is used as the LECS address. wellknown means that the LEC first uses ILMI to attempt to discover the LECS address. If no address is available via that method, then the LEC attempts to use the ATM Forum's "well-known" LECS address (either 47.0079.00.000000.0000.0000.0000.0000.00
LECS address	The ATM address of the LECS to be used instead of the "well-known" LECS.

#### 1.11.3.4.2 Displaying the Default LEC Configuration Mode

This command lets you show whether the default LEC configuration mode is manual (using a LECS other than the one at the "well-known" address) or wellknown (using the LECS at the "well-known" address). Enter the following parameters:

myswitch::configuration lane lec default> **show**LEC Default configuration mode: wellknown

#### 1.11.3.5 Creating an Ethernet LEC

This command lets you create an Ethernet LEC (join an ELAN). When a LEC is created, a corresponding el interface is created. The interface name (el0, el1, etc.) is assigned based on the selector byte entered when the LEC is created. The list of current el interfaces can be displayed using the conflane lec show command or the conflip show command. The maximum number of LECs that can be created on a switch is 16. Enter the following:



This command only allows you to create an instance of a LEC on a switch. To create a LEC on a host, you must use the *ForeRunner* VLAN Manager or use an *ForeRunner* adapter. Refer to the respective user's manual for more information.



You can only create an Ethernet LEC on a switch. To create a Token Ring LEC, you must use a *ForeRunner* PC adapter. Refer to your respective PC adapter user's manual for more information.

#### The parameters for new are defined as follows:

Parameter	Description
LEC Selector byte (HEX)	The 20th byte of the ATM address of the LEC (entered in hexadecimal format). Use the conf atmarp getnsap command to display the entire ATM address.
ELAN name	The name of the ELAN that this LEC is joining.
ip <ip address=""></ip>	The IP address for this el interface. By entering this information here, you will not have to bring up the LEC's el interface separately using confip admin <interface>up.</interface>
mask <ip netmask=""></ip>	The optional subnet mask for this el interface that shows the significant part of the address. It should be entered in dotted decimal notation (e.g., 255.255.255.0).

Parameter	Description
wellknown   manual	The configuration mode that is used when this LEC joins the ELAN.
	Using wellknown means that the LEC first attempts to discover the LECS address using ILMI. If the LEC discovers more than one LECS address, the LEC tries to connect to the LECS in the order that the addresses appear in the list. (This list can be configured using conf nsap registry new and displayed using conf nsap registry show.) If there are no addresses in this list, then the LEC attempts to contact the LECS using the ATM Forum "well-known" address.
	Using manual and the -lecs option means that the LEC attempts to contact the LECS using the LECS address you specified here.
	Using manual and the -les option means that the LEC bypasses the LECS and directly contacts the LES address specified here. If you are using DLE, then this LES address must be the anycast address.  The default is wellknown.
-lecs <lecs address=""></lecs>	The LECS address to use instead of the "well-known" LECS address.
-les <les address=""></les>	The LES address to use for this ELAN. If you are using DLE, then this LES address must be the anycast address.



If you create a LEC and then change the NSAP prefix of the switch at a later time, the change is NOT automatically reflected in the LEC's address. You must delete the LEC and recreate it using the new NSAP prefix.

The following is an example of how to create a LEC:

myswitch::configuration lane lec> new 0x0 eng\_net -ip 169.144.224.222 -mask
255.255.255.0

If you decide not to enter the IP address at the time that you create the LEC, the switch will remind you that you still need to do this. For example:

myswitch::configuration lane lec> new 0x0 eng\_net

LEC is created. Use the commands in "configuration ip" menu to configure this interface.

### 1.11.3.6 Displaying LEC Information

This command lets you display the current LEC information. To display information about all of the LECs that are currently configured on the switch, enter the following parameters:

The fields in this display are defined as follows:

Field	Description
Index	The unique index that identifies this LEC. It is dynamically assigned by the switch when the LEC is created.
Admin Status	Reflects any changes that you have made to the status of the LEC. Up means you have started the LEC. Down means you have stopped the LEC.
Oper Status <sup>1</sup>	Reflects the actual current status of the LEC. Up means the LEC is currently active. Down means the LEC is currently inactive. Joining means that the LEC is in the process of registering with the ELAN.
Sel	The selector byte portion (20th byte) of the ATM address of the LEC in hexadecimal format.
Mode	The configuration mode that is used when a LEC joins the ELAN. wellknown means that the LECS address was discovered via ILMI or that ATM Forum well-known address is being used. manual means that the specified LECS or LES address is used. The default is wellknown.
MACaddress	The Ethernet MAC address for this LEC.
IfName	The el interface name of this LEC.
ELAN	The name of the ELAN to which this LEC belongs.
LECS	The address of the LECS that services the ELAN to which this LEC belongs. If the Mode is manual then no LECS address is displayed because the LEC directly connects to the LES. If the Mode is wellknown then the LECS address is displayed. If the LECS address was discovered via ILMI, then that LECS address is displayed; otherwise, the ATM Forum well-known address is displayed.
LES	The address of the LES that services the ELAN to which this LEC belongs. If you are using DLE, this is the anycast address.

<sup>1.</sup> When you change the administrative status from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the AdminStatus to be up, but the OperStatus to be down. If you refresh the display, the change has taken place and is reflected here.

To display information about a particular LEC that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane lec> show [<LEC index>] [(advanced)]
```

For example, to display information about the LEC with an index number of 1, enter the following parameters:

The fields in this display are defined in the same manner as those in the previous example. You can also display advanced information about the LECs. Enter the following parameters:

```
myswitch::configuration lane lec> show advanced
       Admin
               Oper
 Index Status Status Sel
                                        MACaddress
                             Mode
                                                      IfName
                                                               ET.AN
                        0x00 wellknown 0220481c10bb el0
                                                               eng_net
       LECS: 0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
       LES :c5.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.20
       BUS: 47000580ffe1000000f21c10bb0020481c10bb20
       LEC ID : 2
                                              Discovered ELAN name : eng_net
       Configure Direct VCC : 0.71
                                             Maximum Frame Size : 1516
       Control Direct VCC: 0.125
                                             Control Distribute VCC: 0.75
       Multicast Send VCC: 0.128
                                              Multicast Forward VCC: 0.76
       Last Error : ran out of resources (to LES)
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index that identifies this LEC. It is dynamically assigned by the switch when the LEC is created.
Admin Status	Reflects any changes that you have made to the status of the LEC. Up means you have started the LEC. Down means you have stopped the LEC.

Field	Description
Oper Status <sup>1</sup>	Reflects the actual current status of the LEC. Up means the LEC is currently active. Down means the LEC is currently inactive. Joining means that the LEC is in the process of registering with the ELAN.
Sel	The selector byte portion (20th byte) of the ATM address of the LEC in hexadecimal format.
Mode	The configuration mode that is used when a LEC joins the ELAN. wellknown means that the LECS address was discovered via ILMI or that ATM Forum well-known address is being used. manual means that the specified LECS or LES address is used. The default is wellknown.
MACaddress	The Ethernet MAC address for this LEC.
IfName	The el interface name of this LEC.
ELAN	The name of the ELAN to which this LEC belongs.
LECS	The address of the LECS that services the ELAN to which this LEC belongs. If the Mode is manual then no LECS address is displayed because the LEC directly connects to the LES. If the Mode is wellknown then the LECS address is displayed. If the LECS address was discovered via ILMI, then that LECS address is displayed; otherwise, the ATM Forum well-known address is displayed.
LES	The address of the LES that services the ELAN to which this LEC belongs. If you are using DLE, this is the anycast address.
BUS	The address of the BUS that services the ELAN to which this LEC belongs.
LEC ID	The unique ID that the LES gives the LEC when it joins the ELAN.
Discovered ELAN Name	The ELAN name returned to the LEC by the LES when it joins the ELAN.
Configure Direct VCC	A temporary bidirectional point-to-point VCC set up by the LEC to the LECS.
Maximum Frame Size	The length (in bytes) of the largest frame field. Can be 1516, 1580, 4544, 9234, or 18190.
Control Direct VCC	A bidirectional point-to-point VCC set up by the LEC to the LES.
Control Distribute VCC	A unidirectional point-to-multipoint VCC set up by the LES to the LECs in the ELAN.
Multicast Send VCC	A bidirectional point-to-point VCC set up by the LEC to the BUS for sending multicast data to the BUS.
Multicast Forward VCC	A unidirectional point-to-multipoint VCC set up from the BUS to the LECs in the ELAN.
Last Error	The last error experienced by this LEC, if applicable. This field is reset when the switch is rebooted.

<sup>1.</sup> When you change the administrative status from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the AdminStatus to be up, but the OperStatus to be down. If you refresh the display, the change has taken place and is reflected here.

# 1.11.4 LAN Emulation Configuration Server (LECS) Commands

These commands allow you to configure the LAN Emulation Configuration Server (LECS). You can display the list of available subcommands by typing less? at the lane level.

### 1.11.4.1 Configuring the LECS Administrative Status

This command lets you change the administrative status of the LECS to up (start a LECS service) or down (stop a LECS service). Enter the following parameters:

```
myswitch::configuration lane lecs> admin <LECS index | LECS index range (x-y)> (up | down)
```

## 1.11.4.2 Deleting a LECS

This command lets you delete (stop) a specified LECS service. Enter the following parameters:

```
myswitch::configuration lane lecs> delete < LECS index | LECS index range (x-y)>
```

The parameters for admin and delete are defined as follows:

Parameter	Description
LECS index	The unique integer index of the LECS that is dynamically assigned by AMI when a LECS is created to identify this service from any other service in the same class. Found under the Index field using the conf lane lecs show command.
LECS index range (x-y)	The range of index numbers of the LECSs that you want to start or stop. The index is found under the Index field using conf lane lecs show.
up down	up changes the administrative status of the designated LECS index to up. down changes the administrative status of the designated LECS index to down.

### 1.11.4.3 Creating a LECS

This command lets you create (start) a LECS service. Enter the following parameters:

myswitch::configurat lane lecs> new <LECS Selector byte (HEX)> [-db <LECS database file>]
 [-default <LES atm address>] [<LECS-wka> | none]

The parameters for new are defined as follows:

Parameter	Description
LECS Selector byte (HEX)	The 20th byte of the ATM address of the host or switch that is to run a LECS service (entered in hexadecimal format). Use the conf atmarp getnsap command to display the entire ATM address.
-db <lecs database="" file=""></lecs>	The full path to the location and name of the LECS database file. The default file is lecs.cfg. For information about configuring this file, refer to the Network Configuration manual for your switch.
-default <les address="" atm=""></les>	The default LES address to use in case the LECS configuration file is inaccessible.
<lecs-wka>   none</lecs-wka>	none means the well-known address is disabled so that the LECS can only be contacted by using the switch's actual address (with selector byte). LECS-wka means that the ATM address that you enter is going to be used as the well-known address instead of the ATM Forum well-known address.



Although more than one LECS can be created on a switch, you must ensure that no two LECS are listening on the same address.



If you create a LECS and then change the NSAP prefix of the switch at a later time, the change is NOT automatically reflected in the LECS's address. You must delete the LECS and recreate it using the new NSAP prefix.

### 1.11.4.4 Displaying LECS Information

This command lets you display the current LECS information. To display information about the current LECS configuration on the switch, enter the following parameters:

 myswitch::configuration lane lecs> show

 Index
 AdminStatus
 OperStatus
 Selector
 WKA
 Database

 1
 up
 up
 0x01
 atm-forum
 lecs.cfg

 Default LES: 0x47.0005.80.ffe100.0000.f21a.096b.0020481a096b.a2
 up
 up
 0x02
 none
 lecs.cfg

 3
 up
 up
 0x03
 other
 lecs.cfg

 wka: 0x47.0005.80.ffe100.0000.f21a.11ff1.0020481a11f8.99

The fields in this display are defined as follows:

Field	Description
Index	The unique index number of the LECS that identifies it from other LECSs. This number is dynamically assigned by the switch when the LECS is created.
AdminStatus	Reflects any changes that you have made to the status of the LECS. up means you have started the LECS. down means you have stopped the LECS.
OperStatus <sup>1</sup>	Reflects the actual current status of the LECS. up means the LECS is currently active. down means the LECS is currently inactive.
Selector	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the host or switch that is running the LECS.
WKA	The state of the well-known address for this particular LECS. atm-forum means the LECS is using the default address as defined by the ATM Forum. none means the well-known address has been disabled. other means the well-known address has been redefined, in which case the new address appears on the following line.
Database	The full path to the location and name of the LECS database file. The default file is lecs.cfg.
Default LES	The default LES address to use in case the LECS configuration file is inaccessible. If a default LES address has not been specified, this field is not displayed.

<sup>1.</sup> When you change the administrative status from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the AdminStatus to be up, but the OperStatus to be down. If you refresh the display, the change has taken place and is reflected here.

To display information about a particular LECS that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane lecs> show [<LECS index>]
```

For example, to display information about the LECS with an index number of 1, enter the following parameters:

The fields in this display are defined in the same manner as those listed above in the example for all of the LECS configured on the switch.



If there is an error in the LECS.CFG file that prevents the LECS from starting, an error is printed to the console (if the console is enabled) indicating the line number in which the error occurred.

## 1.11.4.5 Getting the LECS Configuration File

This command lets you download the LECS configuration file. Enter the following:

myswitch::configuration lane lecs> **get** <host>:<remotefile> [<localfile>]

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host from which the LECS database file is to be retrieved.
remotefile	The name of the LECS database file that is to be retrieved.
localfile	The name of the file where the retrieved LECS database file is to be stored. The default local file is lecs.cfg.



For information about configuring this file, refer to the Network Configuration manual for your switch.

If you have configured the transfer protocol to be FTP using conf system protocol, you only need to enter the command shown above to retrieve the LECS file. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file. For information about the conf system protocol command, see Part 2 of the AMI Configuration Configuration Commands Reference Manual.

If you have configured the transfer protocol to be TFTP (this is the default) using conf system protocol, the remote host from which the LECS file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see Installation and Maintenance manual for your switch.

# 1.11.5 LAN Emulation Server (LES) Configuration Commands

These commands allow you to configure the LAN Emulation Server (LES). You can display the list of available subcommands by typing les? at the lane level.

### 1.11.5.1 Configuring the LES Administrative Status

This command lets you change the administrative status of the LES to up (start a LES service) or down (stop a LES service). Enter the following parameters:

```
myswitch::configuration lane les> admin < LES index | LES index range (x-y)> (up \mid down)
```

## 1.11.5.2 **Deleting a LES**

This command lets you delete a specified LES. Enter the following parameters:

```
myswitch::configuration lane les> delete <LES index | LES index range (x-y)>
```

The parameters for admin and delete are defined as follows:

Parameter	Description
LES index	The unique integer index of the LES that is dynamically assigned by AMI when a LES is created to identify this service from any other service in the same class. Found under the Index field using the conf lane les show command.
LES index range (x-y)	The range of index numbers of the LES that you want to start or stop. The index is found under the Index field using conf lane les show.
up   down	up changes the administrative status of the designated LES index to up. down changes the administrative status of the designated LES index to down.

## 1.11.5.3 Creating a LES

This command lets you create a new LES. Enter the following parameters:

```
myswitch::configuration lane les> new <LES Selector Byte (HEX)> <LES name> \
    [-bus <BUS Selector Byte (HEX)>] \
    [-type (ethernet | token-ring)] \
    [-mtu (1516 | 1580 | 4544 | 9234 | 18190)] \
    [-secure wka | <LECS ATM Address>] \
    [-registertlvs (enable | disable)] \
    [-anycast <LES Anycast ATM Address>] \
    [-peers <atm-addr> ...]
```

The parameters for new are defined as follows:

Parameter	Description
LES Selector Byte (HEX)	The 20th byte of the ATM address of the switch that is to run a LES service (entered in hexadecimal format). This command starts a co-located BUS, which means that the LES and BUS services for a particular ELAN are running on the same switch. You cannot create a BUS separately. By default, the LES and BUS will use the same selector byte.
BUS Selector Byte (HEX)	The 20th byte of the ATM address of the BUS associated with this LES. Use this option only if you need to have the BUS use a different selector byte than the LES.
LES name	The user-defined name that helps you to remember what ELAN this LES services.
-type (ethernet   token-ring)	ethernet means the LAN type is Ethernet. token-ring means the LAN type is Token Ring. The default is ethernet.
-mtu (1516   1580   4544   9234   18190)	The length (in number of bytes) of the largest frame field (or MTU size). The default for Ethernet is 1516. The default for Token Ring is 4544. The MTU size must match that of the other hosts and edge devices on the ELAN.
-secure wka   <lecs atm<br="">Address&gt;</lecs>	Indicates you want to activate ELAN access control. If you enter wka, the ATM Forum well-known address is used when running with ELAN access control enabled. In this case, you do not have to type the actual well-known address. If you are using an LECS address that is different than the well-known address, then you must type the full LECS ATM address to be used when running with ELAN access control enabled. ELAN access control is disabled by default.
-registertlys (enable   disable)	enable means the LES supports MPOA operation by accepting flow descriptors from LANE/MPOA clients (LEC/MPCs) that register with it and distributing these flow descriptors to LEC/MPCs in response to LE-ARP queries. disable means the LES collects flow descriptors parameters from LEC/MPCs that register with it, but does not distribute these flow descriptors to LEC/MPCs in response to LE-ARP queries. The default is enable.
-anycast <les anycast="" atm<br="">Address&gt;</les>	The unique anycast ATM address that all LECs in a given ELAN use to connect to one of the Distributed LAN Emulation (DLE) servers for that ELAN. If this option is not used, then the LES address is used, meaning that this is a stand-alone LES/BUS pair (i.e., DLE services are not running). The anycast address <u>must</u> be unique within the first 19 bytes. Anycast addresses cannot be all zeros and the first 19 bytes cannot be all zeros. Anycast addresses cannot be the same as any ATM Forum-defined anycast address.

Parameter	Description
-peers <atm-addr></atm-addr>	The unique ATM address(es) of this DLE server's peer(s). It is through these addresses that all servers in a DLE ELAN connect to and communicate with each other. You must explicitly enter the local LES ATM address in the list of DLE peers. It does not matter in which order the local address appears in the list.



If you create a LES and then change the NSAP prefix of the switch at a later time, the change is NOT automatically reflected in the LES's address. You must delete the LES and recreate it using the new NSAP prefix. If you are using DLE, you must also change the LES's address in the lists of all of the other switches that are running DLE peers. You can use the conf lane les peeradd (described in Section 1.11.5.4) and the conf lane les peerdelete command (described in Section 1.11.5.5) to do this.

### 1.11.5.4 Adding a DLE Peer

This command lets you add a DLE peer server to the list of DLE peer servers for an existing DLE ELAN without destroying and recreating the existing peers. Enter the following:

myswitch::configuration lane les> peeradd <LES index> <Peer ATM Address>

These parameters are defined as follows:

Parameter	Description
LES index	The index number of the LES that you want to add to the list of DLE peer servers for a particular ELAN. This index number is dynamically assigned by the switch when the LES is created. It can be found under the Index field using the conflane les show command.
Peer <atm address=""></atm>	The unique ATM address of the DLE peer server you want to add. It is through this address that all of the DLE peer servers in a DLE ELAN connect to and communicate with each other.



When using this command, the LES must already exist and the ELAN that it services must be a DLE ELAN.

The LES is temporarily administered down while it is being added to the list of peers and comes back up once the process is complete. Because of this, a warning is shown when you issue this command and you are asked if you want to continue. For example:

```
myswitch::configuration lane les> peeradd 1
0x47.0005.80.ffe100.0000.f21a.23c0.0020481a23c0.75
```

WARNING: This command will disable the LES service for the duration of execution. Full ELAN connectivity may not be restored until all the LANE clients reconnect to the LES service

Do you want to continue [n]? y

Type n or **<ENTER>** to abort the command or type y to continue adding the peer.

### 1.11.5.5 Deleting a DLE Peer

This command lets you delete a DLE peer server from the list of DLE peer servers for an existing ELAN without destroying and recreating the existing peers. Enter the following:

myswitch::configuration lane les> peerdelete <LES index> <Peer ATM Address>

These parameters are defined as follows:

Parameter	Description
LES index	The index number of the LES that you want to delete from the list of DLE peer servers for a particular ELAN. This index number is dynamically assigned by the switch when the LES is created. It can be found under the Index field using the conf lane les show command.
Peer <atm address=""></atm>	The unique ATM address of the DLE peer server you want to delete. It is through this address that all of the DLE peer servers in a DLE ELAN connect to and communicate with each other.



When using this command, the LES must already exist and the ELAN that it services must be a DLE ELAN.

The LES is temporarily administered down while it is being deleted from the list of peers and comes back up once the process is complete. Because of this, a warning is shown when you issue this command and you are asked if you want to continue. For example:

myswitch::configuration lane les> peerdelete 2
0x47.0005.80.ffe100.0000.f21a.23c0.0020481a23c0.65

WARNING: This command will disable the LES service for the duration of execution. Full ELAN connectivity may not be restored until all the LANE clients reconnect to the LES service

Do you want to continue deleting the peer [n]? y

Type **n** or **<ENTER>** to abort the command or type **y** to continue deleting the peer.



The local DLE peer server address cannot be deleted using this command.

## 1.11.5.6 Enabling/Disabling ELAN Access Control

This command lets you enable or disable ELAN access control for an existing ELAN without destroying and recreating the LES. (For more information about ELAN access control, see the Network Configuration manual for your switch.) Enter the following:

myswitch::configuration lane les> security <LES index> (disable|enable) [<wka|LECS Addr>]

LECS address required for enabling security

#### These parameters are defined as follows:

Parameter	Description
disable   enable	disable means that you want to de-activate ELAN access control on this LES. enable means that you want to activate ELAN access control on this LES.
wka   LECS Addr	You must enter one of these parameters if you want to enable ELAN access control. If you enter wka, the ATM Forum well-known address is used when running with ELAN access control enabled. In this case, you do not have to type in the actual well-known address, just enter wka.  If you are using an LECS address that is different than the well-known address, then you must type the full LECS ATM address to be used when running with ELAN access control enabled.



When using this command, the LES must already exist.

The LES is temporarily administered down while ELAN access control is being enabled or disabled and comes back up once the process is complete. Because of this, a warning is shown when you issue this command and you are asked if you want to continue. For example:

 $\label{eq:myswitch:configuration} \begin{tabular}{ll} myswitch::configuration lane les> security 2 enable \\ 0x47.0005.80.ffel00.00005.f2la.23c0.0020048la23c0.00 \end{tabular}$ 

WARNING: This command will disable the LES service for the duration of execution. Full ELAN connectivity may not be restored until all the LANE clients reconnect to the LES service

Do you want to continue deleting the peer [n]? y

Type  $\mathbf{n}$  or **<ENTER>** to abort the command or type  $\mathbf{y}$  to continue the process.

## 1.11.5.7 Displaying LES Information

This command lets you display the current LES information. To display information about every LES that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane les> show
 Index AdminStatus OperStatus LesSel Type
                                                MTU
                                                       ELAN
                                                                SECURE TLVs
 1
                              0x10
                                     ethernet
                                                1516 default disable enable
       up
                   up
        LES
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481a42bb.10
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481a42bb.10 (Co-Located)
        BUS
                              0x50
                                     ethernet
                                                1516 eng
                                                                enable disable
 2
                   uρ
       up
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
        LES
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50 (Co-Located)
        BUS
               :c5000580ffe1000000f21c10bb0020481c10bb10 (ANYCAST)
        LECS
               :0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020482a55a0.70
        PEER
                                     ethernet
                                                1516 mktg
 3
                              0x90
                                                                disable enable
       up
                   up
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c16bb.90
        LES
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c16bb.90 (Co-Located)
        BUS
               :c5000580ffe1000000f21c10bb0020481c10bb66 (ANYCAST)
               :0x47.0005.80.ffe100.0000.f21a.24aa.0020481a6754.33
        PEER
               :0x47.0005.80.ffe100.0000.f21c.26bb.0020481b4852.44
        PEER
               :0x47.0005.80.ffe100.0000.f21c.32bb.0020481c6940.50
        PEER
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number of the LES that identifies it from other LESs. This number is dynamically assigned by the switch when the LES is created.
AdminStatus	Reflects any changes that you have made to the status of the LES. up means you have started the LES. down means you have stopped the LES.
OperStatus <sup>1</sup>	Reflects the actual current status of the LES. up means the LES is currently active. down means the LES is currently inactive.
LesSel	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the host or switch that is the LES. This address is used by the peers of this DLE server when they need to contact it.
Туре	Shows what type of ELAN this is. ethernet means that the LAN type is Ethernet. token-ring means that the LAN type is Token Ring.
MTU	The maximum data frame size. Can be 1516, 4544, 9234, or 18190. The default for Ethernet is 1516. The default for Token Ring is 4544.
ELAN	The name of the ELAN that this LES serves.

Field	Description
SECURE	enable means that ELAN access control is running. disable means that ELAN access control is not running.
TLVs	enable means the LES accepts TLV parameters from LEC/MPCs that register with it and distributes these TLVs to LEC/MPCs in response to LE-ARP queries. disable means the LES collects TLV parameters from LEC/MPCs that register with it, but does not distribute these TLVs to LEC/MPCs in response to LE-ARP queries.
LES	The full ATM address of the LES, which the DLE peers use to connect to this server. (If DLE is not running, then the LECs that wish to join the ELAN use this address to contact the LES.)
BUS	The full ATM address of the BUS for the ELAN.
(ANYCAST)	The unique anycast ATM address that all LECs in a given ELAN use to connect to one of the DLE servers for that ELAN. If no address is provided by the user, then this is a standalone LES/BUS pair (i.e., DLE services are not running in that ELAN).
LECS	The LECS address. This address is displayed only if ELAN access control has been enabled.
PEER	If there are any DLE peer servers, shows the full ATM address of each.

<sup>1.</sup> When you change the administrative status from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the AdminStatus to be up, but the OperStatus to be down. If you refresh the display, the change has taken place and is reflected here.

To display information about a particular LES that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane les> show [<LES index>] [(advanced)]
```

For example, to show information about the LES with an index number of 2, enter the following:

```
myswitch::configuration lane les> show 2
 Index AdminStatus OperStatus LesSel Type
                                                MTU
                                                       ELAN
                                                                SECURE TLVs
                                                                enable disable
 2
                              0x50
                                     ethernet
                                                1516 eng
       up
        LES
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
        BUS
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50 (Co-Located)
               :c5000580ffe1000000f21c10bb0020481c10bb10 (ANYCAST)
               :0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        LECS
               :0x47.0005.80.ffe100.0000.f21c.10bb.0020482a55a0.70
        PEER
```

The fields in this display are defined in the same way as those listed in the previous example.

Enter the following parameters to display advanced information about every LES that is currently configured on the switch. Information similar to the following is displayed when DLE is running:

```
myswitch::configuration lane les> show advanced
ELAN Name: "eng"
 LES:
          47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
           c5.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.10 (anycast)
           Point-to-Multipoint VCC to Peers: 0.714
           47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
 BUS:
 Peer #1: 47.0005.80.ffe100.0000.f21a.3552.0020481a3552.10
           Point-to-Point VCC to Peer: 0.713
           Point-to-Multipoint VCC from Peer: 0.61
 LAN Type: Ethernet/IEEE 802.3
                                    Maximum Data Frame Size: 18190
 Non-proxy Control Distribute VCC: 0.716
      Proxy Control Distribute VCC: -.-
             Multicast Forward VCC: 0.718
 Number of local clients: 4
LEC #1 at 47.0005.80.ffel00.0000.f2la.34la.0020481013f2.00 (non-proxy)
  00-20-48-10-13-f2 \rightarrow 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00
 Control Direct VCC: 0.715
LEC #2 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01 (non-proxy)
  02-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01
 Control Direct VCC: 0.719
LEC #3 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02 (non-proxy)
  06-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02
 Control Direct VCC: 0.721
LEC #4 at 47.0005.80.ffe100.0000.f21a.341a.0020481a341a.00 (non-proxy)
  00-20-48-1a-34-1a -> 47.0005.80.ffe100.0000.f21a.341a.0020481a341a.00
 Control Direct VCC: 0.724
```

#### The fields in this display are defined as follows:

Field	Description
ELAN Name	The names of any ELANs associated with this switch.
LES	When DLE is configured, the first ATM address displayed is the LES unicast address that is used by the other DLE peer servers to connect to this server. The second is the LES any-cast address that is used by LECs to connect to the ELAN. (All DLE peer servers in an ELAN must use the same anycast address.) The Point-to-Multipoint VCC to Peers is the VCC on which packets are transmitted by this LES when they are flooded to all of the DLE peer servers. When DLE is not configured, only the single ATM address of the LES that services this particular ELAN is displayed.
BUS	The ATM address of the BUS that services the LECs that are directly connected to this DLE peer server.

Field	Description
Peer #1	The address of one of the DLE peer servers. This is the address at which the LES tries to connect to this DLE peer server. The Point-to-Point VCC to Peer is the VCC that is used to send or receive packets to or from this particular DLE peer server. The Point-to-Multipoint VCC from Peer is the VCC on which packets are received by the LES from this DLE peer server when they are flooded to all of the DLE peer servers.
LAN Type	The type of emulated LAN. Can be either Ethernet/IEEE 802.3 or TokenRing/IEEE 802.5.
Maximum Data Frame Size	The length (in bytes) of the largest frame field. Can be 1516, 1580, 4544, 9234, or 18190.
Non-proxy Control Distribute VCC	The point-to-multipoint connection that the LES maintains to all of the non-proxy LECs that it services.
Proxy Control Distribute VCC	The point-to-multipoint connection that the LES maintains to all of the proxy LECs that it services. This entry is blank if no proxy LECs have joined this ELAN.
Multicast Forward VCC	The VCC on which the BUS forwards broadcast and multicast traffic to all the LECs.
Number of local clients	This is the number of clients connected to this server.
LEC	The LEC ATM address, shows the MAC-to-ATM address mapping for each LEC in this ELAN, and shows whether or not this LEC is a proxy.
Control Direct VCC	The point-to-point connection that the LES maintains to this particular LEC.

Enter the following parameters to display advanced information about each LES that is currently configured on the switch. Information similar to the following is displayed when DLE is not running:

```
myswitch::configuration lane les> show advanced
ELAN Name: "eng"
 LES:
           47.0005.80.ffe100.0000.f21a.341a.0020481a341a.20
           47.0005.80.ffe100.0000.f21a.341a.0020481a341a.20
 BUS:
 LAN Type: Ethernet/IEEE 802.3
                                    Maximum Data Frame Size: 1516
 Non-proxy Control Distribute VCC: 0.728
      Proxy Control Distribute VCC: -.-
             Multicast Forward VCC: 0.730
 Number of local clients: 3
LEC #1 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00 (non-proxy)
  00-20-48-10-13-f2 \rightarrow 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00
 Control Direct VCC: 0.727
LEC #2 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01 (non-proxy)
  02-20-48-10-13-f2 \rightarrow 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01
 Control Direct VCC: 0.731
LEC #3 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02 (non-proxy)
  06-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02
 Control Direct VCC: 0.733
```

# 1.12 Network Module Configuration Commands

These commands let you configure the network modules in your switch fabric. The list of available subcommands is displayed by typing module? at the configuration level.

# 1.12.1 Configuring the State of a Network Module

This command allows you to change the state of a network module up or down. This command should only be used when you want to test the network module. Enter the following parameters:

```
myswitch::configuration module> admin <module> (up | down)
```

These parameters are defined as follows:

Parameter	Description
module	The network module that is to be started or stopped.
up   down	up brings that network module back on-line. down causes the designated network module to be be taken off-line temporarily so that it can be tested.



This command has no effect on Circuit Emulation Services (CES) DS1 and E1 network modules. You can only administer the individual ports on a CES module up or down using the conf port cesds1 admin or conf port cesel admin command.

When the **conf module admin** <module> **down** command is entered, a warning message is displayed as follows:

```
myswitch::configuration module> admin 2B down

Disabling the network module will destroy all existing connections going through it.

Disable the network module [n]?
```

Entering n or pressing **<ENTER>** aborts the command. Entering y tears down all of the existing connections and temporarily places the network module out of service.

To place the module back into service, use the command conf module admin <module> up. At that point, PVCs that are stored in the configuration database are re-established and SVCs are dynamically re-established.

## 1.12.2 Configuring a *FramePlus* Network Module

These commands allow you to configure a *FramePlus* network module. The list of available subcommands is displayed by typing? at the **fram** level.

## 1.12.2.1 Configuring an Application on a FramePlus Network Module

This command lets you configure a *FramePlus* network module to run either a Frame Relay over ATM or a frame-based User to Network Interface (FUNI) application. The network module can only run one application or the other at a time. Enter the following:

```
myswitch::configuration module fram> application <module> <application_key>
```

These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module that is to be configured.
application_key	Indicates the key associated with the type of service to be used on this FramePlus network module. FramePlus network modules run Frame Relay by default. To run FUNI services, please contact FORE's Technical Assistance Center for a FUNI key. To change from FUNI back to Frame Relay, the key is fratm170358. You can look at the Appln field under conf mod display to see which application is currently running.

The application key should be specified only if you want to reconfigure the network module to run a different type of application. Before changing the application, you must administer the network module down as follows:

```
myswitch::configuration module> admin 4a down
Disabling the network module will destroy all
existing connections going through it.
Disable the network module [n]? y
```

Then, you can change the application. When you change the application, the switch deletes all existing services and PVCs that use a different application, and removes them from the CDB (i.e., if you are changing from Frame Relay to FUNI, the switch deletes existing Frame Relay information, and vice versa). The switch warns you as follows:

```
myswitch::configuration module fram> app 4a xxxxxxxxx
Changing application may cause deletion of service/connection on switch and CDB. Proceed [n]? y
```

Then, you need to administer the network module up as follows:

```
myswitch::configuration module> admin 4a up
```

## 1.12.2.2 Configuring the Buffer on a FramePlus Network Module

This command lets you configure the high and low priority EPD/PPD buffer sizes on a *FramePlus* network module. The total buffer size is 32,768 cells. There are four fixed configuration models for partitioning the buffer between the two priorities, as shown in the table below. You can select one of these.



See Appendix D in the Network Configuration manual for your switch for more information about configuring the buffer.

### Enter the following:

```
myswitch::configuration module fram> setmem <module> (highzero | highlquarter |
highlquarter | highlquarter)
```

These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module that is to be configured.
highzero	The high priority buffer will have 0 cells and the low priority buffer will have 32,768 cells. (This implies that the highthresholds command under conf module fram will have no meaning if it is used.) This is the default value.
high1quarter	The high priority buffer will have 8,192 cells and the low priority buffer will have 24,576 cells.
high2quarter	The high priority buffer will have 16,384 cells and the low priority buffer will have 16,384 cells. This is the default value.
high3quarter	The high priority buffer will have 24,576 cells and the low priority buffer will have 8,192 cells.

Before you can change the buffer allocation, you must first take the network module out of service by administering it down as follows:

```
myswitch::configuration module> admin 1d down
Disabling the network module will destroy all
existing connections going through it.

Disable the network module [n]? y

myswitch::configuration module> fram
myswitch::configuration module fram> set 1d high3quarter
```

## 1.12.2.3 Configuring the High Priority Buffer on a FramePlus Network Module

This command lets you configure EPD/PPD thresholds for the high priority buffer on a *FramePlus* network module.



This command has no effect when the highzero option has been selected under conf module fram setmem.



See Appendix D in the Network Configuration manual for your switch for more information about configuring this option.

### Enter the following:

```
myswitch::configuration module fram> highthresholds <module>
        [-clp0epd (50|62|75|87)]
        [-clp1ppd (50|62|75|87)]
        [-clp1epd (25|37|50|62)]
```

### These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module that is to be configured.
clp0epd	The threshold for CLP0EPD, in percentage of the available size, for the high priority queue buffer. The default value is 62%. EPD discards traffic once this CLP=0 threshold has been surpassed.
clp1ppd	The threshold for CLP1PPD, in percentage of the available size, for the high priority queue buffer. The default value is 50%. PPD discards traffic once this CLP=1 threshold has been surpassed.
clp1epd	The threshold for CLP1EPD, in percentage of the available size, for the high priority queue buffer. The default value is 37%. EPD discards traffic once this CLP=1 threshold has been surpassed.



There is a CLP0PPD threshold that is automatically set for you as 87.5% of the buffer size of each queue and cannot be changed. (It is not displayed in AMI, but you need to know this value because the other thresholds are calculated on the <u>remaining</u> buffer size.)

## 1.12.2.4 Configuring the Low Priority Queue on a FramePlus Network Module

This command lets you configure EPD/PPD thresholds for the low priority buffer on a *FramePlus* network module.



See Appendix D in the Network Configuration manual for your switch for more information about configuring this option.

### Enter the following:

```
myswitch::configuration module fram> lowthresholds <module>
    [-clp0epd (50|62|75|87)]
    [-clp1ppd (50|62|75|87)]
    [-clp1epd (25|37|50|62)]
```

These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module that is to be configured.
clp0epd	The threshold for CLP0EPD, in percentage of the available size, for the low priority queue buffer. The default value is 62%. EPD discards traffic once this CLP=0 threshold has been surpassed.
clp1ppd	The threshold for CLP1PPD, in percentage of the available size, for the low priority queue buffer. The default value is 50%. PPD discards traffic once this CLP=1 threshold has been surpassed.
clp1epd	The threshold for CLP1EPD, in percentage of the available size, for the low priority queue buffer. The default value is 37%. EPD discards traffic once this CLP=1 threshold has been surpassed.



There is a CLP0PPD threshold that is automatically set for you as 87.5% of the buffer size of each queue and cannot be changed. (It is not displayed in AMI, but you need to know this value because the other thresholds are calculated on the <u>remaining</u> buffer size.)

## 1.12.2.5 Configuring OAM Rates on a FramePlus Network Module

This command lets you set the receive and transmit rates of AIS and RDI cells on a *FramePlus* network module. Enter the following:

```
myswitch::configuration module fram> oamf5 <module> [-aisrx <sec>] [-aistx <sec>]
[-rdirx <sec>] [-rditx <sec>]
```

#### These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module that is to be configured.
aisrx <sec></sec>	Time interval, in seconds, at which an AIS OAM cell is to be received. The default is 3.
aistx <sec></sec>	Time interval, in seconds, at which an AIS OAM cell is to be transmitted. The default is 1.
rdirx <sec></sec>	Time interval, in seconds, at which an RDI OAM cell is to be received. The default is 3.
rditx <sec></sec>	Time interval, in seconds, at which an RDI OAM cell is to be transmitted. The default is 1.

## 1.12.2.6 Upgrading the Software on a FramePlus Network Module

This command lets you upgrade the software on a *FramePlus* network module. For more information, see Appendix D in the Network Configuration manual for your switch. Enter the following:

```
myswitch::configuration module fram> upgrade <module> <remotehost>:<fullpath to
remotefile>
```

### These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module on which you want to upgrade the software.
remotehost	The IP address of the remote host on which the upgrade file resides.
full path to remotefile	The full path name of the upgrade file.

Since this command uses TFTP as the transfer protocol, the remote host on which the upgrade file resides must be a tftpboot server. If you are unsure of how to configure the bootp server and the tftpboot server properly, see Chapter 4 of the Installation and Maintenance manual for your switch.

## 1.12.2.7 Configuring OAM F5 Functionality on a FramePlus Network Module

This command lets you enable or disable the generation of OAM F5 cells at the module level on a *FramePlus* network module.



This command only affects Frame Relay service on a *FramePlus* network module. It does not have any effect when the FUNI application is being used.

### Enter the following:

myswitch::configuration module fram> oamf5 <module> (enabled|disabled)

#### These parameters are defined as follows:

Parameter	Description
module	The FramePlus network module that is to be configured.
enabled   disabled	enabled indicates that OAM F5 (path) cells will be generated on the specified FramePlus network module. disabled indicates that OAM F5 (path) cells will not be generated on the specified FramePlus network module. The default is enabled.

## 1.12.2.8 Enabling and Disabling Statistics on a FramePlus Network Module

This command lets you enable or disable the collection of statistics on a *FramePlus* network module. Enter the following:



To collect Frame Relay statistics, they must be enabled both here <u>and</u> at the Frame Relay service level under <u>conf fratm stats</u>. To collect FUNI statistics, they must be enabled both here <u>and</u> at the FUNI service level under <u>conf funi stats</u>. They are enabled here by default.

 $\verb|myswitch|::configuration module fram> \verb|stats| < module> (enabled | disabled)|$ 

Parameter	Description
module	The FramePlus network module that is to be configured.
enabled   disabled	enabled means statistics are collected on the designated FramePlus network module. disabled means statistics are not collected on the designated FramePlus network module. The default is enabled. When statistics are disabled, the counters show zeros.

## 1.12.2.9 Displaying Information for a FramePlus Network Module

This command lets you display detailed information about the configuration of a *FramePlus* network module. Enter the following:

#### These fields are defined as follows:

Field	Description
Module	The FramePlus network module that has been configured.
Appln	The current application that is running on this <i>FramePlus</i> network module. Displays fratm for Frame Relay or funi for FUNI. The default application is fratm.
Appln swRel	The embedded software release that is currently running on this <i>FramePlus</i> network module.
Boot swRel	The boot software release on this FramePlus network module.
Stats monitor	Shows if statistics collection is enabled (on) or disabled (off) for this <i>FramePlus</i> network module.
Oam monitor	Shows if OAM F5 cell generation is enabled (on) or disabled (off) for this <i>FramePlus</i> network module.
Operational state	Shows the operational status of the current application.
Product number	The FORE Systems product number for this module.

If no FramePlus network modules are installed, then the following is displayed:

No FRAM netmod configuration information is available

## 1.12.2.10 Displaying the Settings on a FramePlus Network Module

This command lets you display the configuration of a *FramePlus* network module. Enter the following:

myswitch::configuration module fram> show Module Buffer Buffer Clp0Epd Clp1Ppd Clp1Epd AIS AIS RDI high low high low high low high low rx 0 32768 N/A 62 N/A 50 N/A 37 3 4A 3 1 1 0 32768 N/A 62 N/A 50 N/A 37 3 1 4в

These fields are defined as follows:

Field	Description
Module	The FramePlus network module that has been configured.
Buffer high	The used-configured size for the high priority buffer, in cells. Can be one of four sizes.
Buffer low	The used-configured size for the low priority buffer, in cells. Can be one of four sizes.
Clp0Epd high	The CLP0EPD threshold for the high priority buffer, in percentage of the available size. The default value is 62%. EPD discards traffic once this CLP=0 threshold has been surpassed.
Clp0Epd low	The CLP0EPD threshold for the low priority buffer, in percentage of the available size. The default value is 62%. EPD discards traffic once this CLP=0 threshold has been surpassed.
Clp1Ppd high	The CLP1PPD threshold for the high priority buffer, in percentage of the available size. The default value is 50%. PPD discards traffic once this CLP=1 threshold has been surpassed.
Clp1Ppd low	The CLP1PPD threshold for the low priority buffer, in percentage of the available size. The default value is 50%. PPD discards traffic once this CLP=1 threshold has been surpassed.
Clp1Epd high	The CLP1EPD threshold for the high priority buffer, in percentage of the available size. The default value is 37%. EPD discards traffic once this CLP=1 threshold has been surpassed.
Clp1Epd low	The CLP1EPD threshold for the low priority buffer, in percentage of the available size. The default value is 37%. EPD discards traffic once this CLP=1 threshold has been surpassed.
AIS rx	Time interval, in seconds, at which an AIS OAM cell is to be received.
AIS tx	Time interval, in seconds, at which an AIS OAM cell is to be transmitted.
RDI rx	Time interval, in seconds, at which an RDI OAM cell is to be received.
RDI tx	Time interval, in seconds, at which an RDI OAM cell is to be transmitted.



There is a CLPOPPD threshold that is set by default as 87.5% of the buffer size of each buffer and cannot be changed. (It is not displayed.)

## 1.12.3 Resetting a Network Module

This command is the software equivalent of removing and immediately re-inserting a network module while the switch is on. This allows you to reset the connections on a given network module without having physical access to the switch. Enter the following parameters:

```
myswitch::configuration module> reset <module>
```

This parameter is defined as follows:

Parameter	Description
module	The network module you want to reset.



All SVCs associated with this network module are torn down upon a reset and attempt to reconnect as needed. All PVCs associated with this network module are torn down and set up again upon a reset. Depending on the number of PVCs configured and the type of processor in your switch, it may take a short time for all of the PVCs to be re-established after a reset.

For example, if you want to reset network module 3B, enter the following:

```
myswitch::configuration module> reset 3b
```

The switch then cautions you that all connections will be torn down. To abort the reset, type n or press <ENTER>. To continue with the reset, type y.

```
Resetting the network module will destroy the existing connections temporarily. Reset the network module [n]? \mathbf{y}
```

# 1.12.4 Displaying Network Module Configuration Information

This command lets you display general information about network modules that are currently installed in a switch fabric. Enter the following parameters:

myswitch::configuration module> show

Module Series Admin Speed Ports Timing Rev. Serial# ProductNumber
1A C up 100.0 6 no 1.0 N/A NM-6/100MMSCC
1B C up 155.0 4 yes 1.1 N/A NM-4/155MMSCC
1C C2 up 1.536 4 yes 0.1 00000122 NMFR-4/DS1A

The fields in this display are defined as follows:

Field	Description
Module	Shows each network module currently installed in the switch fabric. 1 means that it is the switch fabric in slot 1. The letter shows the position of the network module in the switch fabric. E is the intra-fabric port to the other switch fabrics in an ASX-1000 or a TNX-1100 chassis.
Series	The hardware series of the network module. C is a Series C module. LC is a Series LC module. C2 is a circuit emulation services (CES) module or a <i>FramePlus</i> module. LE is an interface on an LE 155 switch. D is a Series D module.
Admin	up means this module is enabled. down means this module is disabled.
Speed	The speed in Mbps of the ports.
Ports	The number of ports on the network module.
Timing	yes means this network module supports distributed timing and no means that it does not.
Rev.	The hardware revision level of this network module.
Serial # <sup>1</sup>	The serial number of this network module.
Product Number	The FORE Systems product number for this module. NM is network module, CE is circuit emulation, FR is FramePlus, BPB is the ASX-1000 or TNX-1100 intra-fabric module.

<sup>1.</sup> This field is only available for Series D modules.

## 1.12.5 Configuring Traffic on a Network Module

These commands enable you to configure or to display information about the traffic on the network modules. To list the available subcommands, type traffic? at the module level.

```
myswitch::configuration module> traffic ?
c> lc> le> d>
```

## 1.12.5.1 Configuring Traffic on a Series C Network Module

These commands let you configure or display information about the traffic on Series C network modules. To list the available subcommands, type c? at the traffic level.

### 1.12.5.1.1 Setting Early Packet Discard on a Series C Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) on a specified network module. This is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 frames that arrive when the shared buffer is over this threshold are discarded in whole. Enter the following parameters:

```
myswitch::configuration module traffic c> epd <module> <number of cells>
```

Parameter	Description
module	The network module to be configured for Early Packet Discard.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. By default, this value is set to $90\%$ of the shared buffer size.

## 1.12.5.2 Setting FIFO Blocking on a Series C Network Module

This command lets you set FIFO blocking on a specific network module. FIFO blocking enables buffering on the fabric when the network module buffers are full. Enter the following parameters:

myswitch::conf module traffic c> fifoblock <module> (normal | enabled)

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured for FIFO blocking.
normal   enabled	normal means that the network module passes traffic normally. enabled means that FIFO blocking takes place on the network module when the buffers are full. The default is normal.

## 1.12.5.3 Displaying Traffic Models for a Series C Network Module

This command allows you to display the different types of traffic memory models on a network module. Enter the following parameters:

 myswitch::configuration module traffic c> models

 Model
 Memory Ucasts Mcasts
 MOUTS
 Cells
 Name

 1
 32Kx48
 4096
 512
 1024
 2048
 default

 2
 128Kx48
 6144
 512
 1024
 12288
 default

 3
 128Kx48
 11264
 1024
 2048
 10240
 more conns

 5
 128Kx48
 2048
 2048
 16384
 8192
 VP shaping

 6
 128Kx48
 3072
 128
 1024
 13312
 more cells

 7
 32Kx48
 2048
 256
 1024
 2560
 more cells

The fields in this display are defined as follows:

Field	Description
Model <sup>1</sup>	The shared memory model for this configuration. This is the number to enter for the <model> parameter when using the conf module traffic c setmodel command.</model>
Memory	The size of this shared memory configuration, in bytes.
Ucasts <sup>2</sup>	The maximum number of unicast connections supported for this model. Half of these connections are reserved for low-priority connections (ABR, UBR) and half are reserved for high-priority connections (VBR, CBR). For example, if a model supports 4K unicast connections, it really supports 2K VBR or CBR connections and 2K ABR or UBR connections.

Field	Description
Mcasts	The number of input multicast connections supported from the switch fabric to the network module for this shared memory model. Half of these connections are reserved for low-priority connections (ABR, UBR) and half are reserved for high-priority connections (VBR, CBR). A multicast connection can have multiple outputs on the same network module. The number of outputs does not figure into this constraint.
MOuts	The number of output multicast connections supported from the network module to the link for this shared memory model. Any multicast connection can have multiple outputs on the same network module or the same port. If one multicast connection has four outputs, it requires 1 mcast and 4 mouts. Adding an output to a multicast connection can fail if all of the outputs are in use. Adding the multicast connection might not fail.
Cells	The total amount of cell buffering that is supported for this shared memory model.
Name	The identifier for this shared memory model.

<sup>&</sup>lt;sup>1.</sup> Memory model 4 has been removed.

## 1.12.5.4 Setting Traffic Models on a Series C Network Module

This command lets you select one of the traffic memory models for a specific network module. Enter the following parameters:

myswitch::configuration module traffic c> setmodel <module> <model>

Parameter	Description
module <sup>1</sup>	The network module to be configured.
$model^2$	The predefined memory model to be used for this network module. The models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections. Enter the number found in the Model field of the conf module traffic c models command for the shared memory configuration that you want to use.

<sup>1.</sup> The following Series C network modules can only use the following traffic memory models: NM-6/25UTPEC and NM-4/155UTP5EC can only use models 1 and 7; all other Series C network modules can only use models 2 - 6.

<sup>2.</sup> The Series C network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

<sup>&</sup>lt;sup>2.</sup> The network module must be reset for this command to take effect.

## 1.12.5.5 Displaying Traffic on a Series C Network Module

This command enables you to display traffic model information about the Series C network modules. Enter the following parameters:

```
myswitch::configuration module traffic c> show

Module Memory Model EPD FIFOblock

2A 128Kx48 2 6653 enabled

2B 128Kx48 2 8036 enabled

2C 128Kx48 2 8036 enabled

2D 128Kx48 2 8036 enabled
```

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Memory	The hardware configuration this shared memory model supports, in units of 48-bit words (x48).
Model	The shared memory model used for this network module. See conf module traffic c models for more information.
EPD	The threshold for AAL5 Early Packet Discard on this network module.
FIFOblock	Displays enabled if FIFO blocking is enabled on this network module. Otherwise, displays normal. The default is normal.

You can also display traffic model information about an individual Series C network module. Enter the following parameters:

```
myswitch::configuration module traffic c> show [<module>]
myswitch::configuration module traffic c> show 2C

Module Memory Model EPD FIFOblock
2C 128Kx48 2 8036 enabled
```

The fields in this display are defined in the same manner as those listed in the example above. If no Series C network modules are installed, the following is displayed:

```
myswitch::configuration module traffic c> show
No Series-C traffic information is available
```

## 1.12.5.6 Configuring Traffic on a Series LC Network Module

These commands let you configure or display information about the traffic on Series LC network modules. To list the available subcommands, type lc? at the traffic level.

```
myswitch::configuration module traffic> 1c ?
  epd     efci     models     setmodel
  show
```

### 1.12.5.6.1 Setting EPD on a Series LC Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) on a Series LC network module. This is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 packets that arrive when the shared buffer is over this threshold are discarded in whole. Enter the following parameters:

```
myswitch::conf module traffic lc> epd <module> [UBR] <number of cells>
```

Parameter	Description
module	The network module to be configured for Early Packet Discard.
UBR	If UBR is entered, the AAL5 packet drop threshold is used for AAL5 UBR connections only. If UBR is not entered, the AAL5 packet drop threshold is used for all other AAL5 connections.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. By default, this value is set to 90% of the shared buffer size.

### 1.12.5.6.2 Setting EFCI on a Series LC Network Module

This command lets you designate the cell buffer threshold over which Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set. When the EFCI code point is set, this signals congestion to downstream flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties below the off threshold. Enter the following parameters:

myswitch::conf module traffic lc> efci <module> (on | off) <number of cells>

Parameter	Description
module	The port on which the EFCI threshold will be set.
on   off <sup>1</sup>	on means the EFCI bit will be set when the threshold number is reached, signalling congestion. off means the EFCI bit will be cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the ABR <sup>2</sup> cells will have the EFCI bit set. The default for the on threshold is 64. The default for the off threshold is 1.

<sup>1.</sup> The value for the off threshold must always be less than the value for the on threshold.

<sup>2.</sup> The Series LC network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

### 1.12.5.6.3 Displaying Traffic Models for a Series LC Network Module

This command allows you to display the different types of traffic memory models on a Series LC network module. Enter the following parameters:

myswitch::configuration module traffic lc> models							
	Cell	Table					
Model	Memory	Memory	Ucasts	Mcasts	Cells	Counters	Name
1	256Kx64	32Kx32	6144	512	32768	0	default
2	256Kx64	32Kx32	6144	512	16384	1	one counter
3	256Kx64	32Kx32	6144	512	8192	2	two counters
4	256Kx64	64Kx32	6144	512	32768	2	default
5	512Kx64	64Kx32	6144	512	65536	2	default
6	256Kx64	32Kx32	4096	1024	24576	1	more mcast
7	256Kx64	64Kx32	4096	1024	32768	2	more mcast
8	512Kx64	64Kx32	4096	1024	65536	2	more mcast

The fields in this display are defined as follows:

Field	Description
Model <sup>1</sup>	The shared memory model for this configuration. This is the number to enter for the <model> parameter when using the conf module traffic lc setmodel command.</model>
Cell Memory <sup>2</sup>	The hardware configuration this shared memory model supports, in units of 64-bit words (x64).
Table Memory	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Ucasts	The maximum number of unicast connections supported by this shared memory configuration.
Mcasts <sup>3</sup>	The number of input multicast connections supported from the switch fabric to the network module by this shared memory configuration.
Cells	The total amount of cell buffering that is supported by this shared memory configuration.
Counters	The number of per-connection counters that is supported by this shared memory configuration. 0 means there are no per-connection counters. 1 means there are per-connection counters for cells transmitted and for cells lost. 2 means there are per-connection counters for cells transmitted, for cells lost, for intentional cells lost, and for unintentional cells lost.
Name	The identifier for this shared memory model.

<sup>1.</sup> For proper operation, all Series LC network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LC modules in a switch should either use models 1-5 OR models 6-8.

The following Series LC network modules can only use the following traffic memory models: OC-3 MM and UTP can only use models 1, 2, 3, and 6; OC-3 SM can only use models 4 and 7; and OC-12 MM and SM can only use models 5 and 8.

 $<sup>^{2}</sup>$ . The Cell Memory and Table Memory sizes determine which memory models are appropriate for any given network module.

<sup>&</sup>lt;sup>3.</sup> Only one multicast output is supported per port for each multicast connection.

### 1.12.5.6.4 Setting Traffic Models on a Series LC Network Module

This command lets you select one of the traffic memory models on a Series LC network module. Enter the following parameters:

myswitch::configuration module traffic lc> **setmodel** <module> <model>

### These parameters are defined as follows:

Parameter	Description
$module^1$	The network module to be configured.
$model^2$	The predefined memory model to be used for this Series LC network module. The various models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections, and the number of per-connection counters. Enter the number found in the Model field of the conf module traffic lc models AMI command for the shared memory configuration that you want to use.

<sup>&</sup>lt;sup>1.</sup> For proper operation, all Series LC network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LC modules in a switch should either use models 1-5 OR models 6-8.

The following Series LC network modules can only use the following traffic memory models: OC-3 MM and UTP can only use models 1, 2, 3, and 6; OC-3 SM can only use models 4 and 7; and OC-12 MM and SM can only use models 5 and 8.

<sup>&</sup>lt;sup>2.</sup> The switch software must be restarted for this command to take effect.

### 1.12.5.6.5 Displaying Traffic on a Series LC Network Module

This command lets you display traffic model information about all of the Series LC network modules in a switch fabric. Enter the following parameters:

$\verb myswitch::configuration  \\$			module	traffic	lc> sh	ow	
	Cell	Table			UBR	EFCI	EFCI
Module	Memory	Memory	Model	EPD	EPD	On	Off
1A	256Kx64	32Kx32	3	256	256	256	1
1B	256Kx64	32Kx32	3	256	256	256	1
1D	512Kx64	64Kx32	7	58050	58050	64	1

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Cell Memory	The hardware configuration this memory model supports (x64).
Table Memory	The hardware configuration this memory model supports (x32).
Model	The shared memory model used for this network module. See conf module traffic lc models for more information.
EPD	The AAL5 packet drop threshold for CBR, VBR, and ABR traffic on this network module, in cells.
UBR EPD	The AAL5 packet drop threshold for UBR traffic on this network module, in cells.
EFCI On	The threshold value at which the EFCI will be set (turned on), signalling congestion, for ABR <sup>1</sup> traffic, in cells.
EFCI Off	The threshold value at which the EFCI will be cleared (turned off), indicating no congestion for ABR traffic, in cells.

<sup>1.</sup> The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

You can also display traffic model information about an individual Series LC network module. Enter the following parameters:

```
myswitch::configuration module traffic lc> show [<module>]
myswitch::configuration module traffic lc> show 1B
           Cell
                  Table
                                         UBR
                                               EFCI
                                                      EFCI
Module Memory Memory Model
                                  EPD
                                         EPD
                                                 On
                                                       Off
        256Kx64 32Kx32 3
                                  256
                                         256
                                                256
 1B
                                                         1
```

The fields in this display are defined in the same manner as those listed in the example above.

If no Series LC network modules are installed, the following is displayed:

```
myswitch::configuration module traffic lc> show
No Series-LC traffic information is available
```

## 1.12.5.7 Configuring Traffic on a Series LE Network Module

These commands let you configure or display information about the traffic on Series LE network modules. To list the available subcommands, type le? at the traffic level.

```
myswitch::configuration module traffic> le ?
  epd     efci     models     setmodel
  show
```



The conf module traffic le commands are only valid on an LE 155 switch.

### 1.12.5.7.1 Setting EPD on a Series LE Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) on a Series LE network module. This is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 packets that arrive when the shared buffer is over this threshold are discarded in whole. Enter the following parameters:

```
myswitch::conf module traffic le> epd <module> [UBR] <number of cells>
```

Parameter	Description
module	The network module to be configured for Early Packet Discard.
UBR	If UBR is entered, the AAL5 packet drop threshold is used for AAL5 UBR connections only. If UBR is not entered, the AAL5 packet drop threshold is used for all other AAL5 connections.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. By default, this value is set to 90% of the shared buffer size.

### 1.12.5.7.2 Setting EFCI on a Series LE Network Module

This command lets you designate the cell buffer threshold over which Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set. When the EFCI code point is set, this signals congestion to downstream flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties below the off threshold. Enter the following parameters:

myswitch::conf module traffic le> efci <module> (on | off) <number of cells>

Parameter	Description
module	The port on which the EFCI threshold will be set.
on   off <sup>1</sup>	on means the EFCI bit will be set when the threshold number is reached, signalling congestion. off means the EFCI bit will be cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the ABR <sup>2</sup> cells will have the EFCI bit set. The default for the on threshold is 64. The default for the off threshold is 1.

<sup>1.</sup> The value for the off threshold must always be less than the value for the on threshold.

<sup>&</sup>lt;sup>2.</sup> The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

#### 1.12.5.7.3 Displaying Traffic Models for a Series LE Network Module

This command allows you to display the different types of traffic memory models on a Series LE network module. Enter the following parameters:

myswitch::configuration module traffic le> <b>models</b>							
	Cell	Table					
Model	Memory	Memory	Ucasts	Mcasts	Cells	Counters	Name
1	256Kx64	32Kx32	6144	512	32768	0	default
2	256Kx64	32Kx32	6144	512	16384	1	one counter
3	256Kx64	32Kx32	6144	512	8192	2	two counters
4	256Kx64	64Kx32	6144	512	32768	2	default
5	512Kx64	64Kx32	6144	512	65536	2	default
6	256Kx64	32Kx32	4096	1024	24576	1	more mcast
7	256Kx64	64Kx32	4096	1024	32768	2	more mcast
8	512Kx64	64Kx32	4096	1024	65536	2	more mcast

The fields in this display are defined as follows:

Field	Description
Model <sup>1</sup>	The shared memory model for this configuration. This is the number to enter for the <model> parameter when using the conf module traffic le setmodel command.</model>
Cell Memory <sup>2</sup>	The hardware configuration this shared memory model supports, in units of 64-bit words (x64).
Table Memory	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Ucasts	The maximum number of unicast connections supported by this shared memory configuration.
Mcasts <sup>3</sup>	The number of input multicast connections supported from the switch fabric to the network module by this shared memory configuration.
Cells	The total amount of cell buffering that is supported by this shared memory configuration.
Counters	The number of per-connection counters that is supported by this shared memory configuration. 0 means there are no per-connection counters. 1 means there are per-connection counters for cells transmitted and for cells lost. 2 means there are per-connection counters for cells transmitted, for cells lost, for intentional cells lost, and for unintentional cells lost.
Name	The identifier for this shared memory model.

<sup>1.</sup> For proper operation, all Series LE network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LE modules in a switch should either use models 1-3 OR model 6.

The Series LE network modules can only use the following traffic memory models: 1, 2, 3, and 6.

<sup>&</sup>lt;sup>2.</sup> The Cell and Table Memory sizes determine which memory models are appropriate for a given network module.

<sup>&</sup>lt;sup>3.</sup> Only one multicast output is supported per port for each multicast connection.

### 1.12.5.7.4 Setting Traffic Models on a Series LE Network Module

This command lets you select one of the traffic memory models on a Series LE network module. Enter the following parameters:

myswitch::configuration module traffic le> setmodel <module> <module> <module>

These parameters are defined as follows:

Parameter	Description
module <sup>1</sup>	The network module to be configured.
model <sup>2</sup>	The predefined memory model to be used for this Series LE network module. The various models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections, and the number of per-connection counters. Enter the number found in the Model field of the conf module traffic le models AMI command for the shared memory configuration that you want to use.

<sup>1.</sup> For proper operation, all Series LE network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LE modules in a switch should either use models 1-3 or model 6.

The Series LE network modules can only use the following traffic memory models: 1, 2, 3, and 6.

<sup>&</sup>lt;sup>2.</sup> The switch software must be restarted for this command to take effect.

#### 1.12.5.7.5 Displaying Traffic on a Series LE Network Module

This command lets you display traffic model information on the Series LE network modules. Enter the following parameters:

	w	le> show	traffic	${\tt module}$	myswitch::configuration		
EFCI	EFCI	UBR			Table	Cell	
Off	On	EPD	EPD	Model	Memory	Memory	Module
1	64	16499	16499	2	32Kx32	256Kx64	1B
1	64	16499	16499	2	32Kx32	256Kx64	1C

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Cell Memory	The size of this shared memory cell RAM configuration (x64).
Table Memory	The size of this shared memory table RAM configuration (x32).
Model	The shared memory model used for this network module. See conf module traffic le models for more information.
EPD	The AAL5 packet drop threshold for CBR, VBR, and ABR traffic on this network module, in cells.
UBR EPD	The AAL5 packet drop threshold for UBR traffic on this network module, in cells.
EFCI On	The threshold value at which the EFCI will be set (turned on), signalling congestion, for ABR <sup>1</sup> traffic, in cells.
EFCI Off	The threshold value at which the EFCI will be cleared (turned off), indicating no congestion for ABR traffic, in cells.

<sup>1.</sup> The Series LE network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

You can also display traffic model information about an individual Series LE network module. Enter the following parameters:

```
myswitch::configuration module traffic le> show [<module>]
myswitch::configuration module traffic le> show 1B
          Cell
                 Table
                                        UBR
                                              EFCI
                                                     EFCI
Module Memory Memory Model
                                 EPD
                                        EPD
                                                On
                                                      Off
 1в
       256Kx64 32Kx32 2
                               16499 16499
                                                 64
                                                        1
```

The fields in this display are defined in the same manner as those listed in the example above.

If no Series LE network modules are installed (this is not an LE 155 switch), then the following is displayed:

```
myswitch::configuration module traffic le> show
No Series-LE traffic information is available
```

## 1.12.5.8 Configuring Traffic on a Series D Network Module

These commands let you configure or display information about the traffic on Series D network modules. To list the available subcommands, type ? at the d level.

### 1.12.5.8.1 Enabling/Disabling the AAL5 Transmitted PDU Counter

This command lets you enable or disable the per-connection AAL5 transmitted Protocol Data Unit (PDU) counter on a per network module basis on a Series D network module. Enter the following parameters:

myswitch::configuration module traffic d> aal5pktcount <module> (enable | disable)

Parameter	Description
module <sup>1</sup>	The network module to be configured for counting AAL5 packets.
enable   disable	enable means the network module will count the number of transmitted AAL5 PDUs. disable means the network module will not count the number of transmitted AAL5 PDUs. The default is disable.

<sup>1.</sup> You must reset the network module once you have entered this command.

## 1.12.5.8.2 Configuring Alternate CLP Thresholds

This command allows you to set the per-connection alternate CLP thresholds on a per network module basis. Enter the following:

myswitch::configurat module traffic d> altclpthresh <module> (clp1 | clp01) <threshold>

Parameter	Description
module	The network module to be configured with a new CLP threshold.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for a connection is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the CLP=0+1 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for a connection is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the CLP=1 threshold.
threshold	The number of cells in the per-connection buffer at which the connection drops CLP=1 or CLP=0+1 cells. These thresholds can only be adjusted in increments of multiples of 16 cells (e.g., 16, 32, 48). For CLP=1, the minimum value is 0, the maximum is the CLP=0+1 threshold - 16 cells, and the default is 256 cells. For CLP=0+1, the minimum value is the CLP=1 threshold + 16 cells, the maximum is 4,080 cells, and the default is 4,080 cells.

### 1.12.5.8.3 Setting EPD on a Series D Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) for UBR traffic and a different threshold value for AAL5 EPD for CBR, VBR, and ABR traffic on a Series D network module. This works differently than it does for other network modules. On a Series D network module, this is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 packets are discarded in whole if they arrive when the total cell buffering is over this threshold and when the corresponding dedicated queue is full. Enter the following:

myswitch::configuration module traffic d> epd <module> [ubr] <number of cells>

Parameter	Description
module	The network module to be configured for Early Packet Discard.
ubr	If ubr is entered, the AAL5 packet drop threshold is used for AAL5 UBR connections only. If ubr is not entered, the AAL5 packet drop threshold is used for CBR, VBR, and ABR AAL5 connections.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. The default value is set to 90% of the total cell buffer size for both the UBR and non-UBR thresholds.

### 1.12.5.8.4 Setting EFCI on a Series D Network Module

This command lets you designate the cell buffer threshold over which all cells have their explicit forward congestion indicator (EFCI) code point set. When the EFCI code point is set, this signals congestion to downstream flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties below the off threshold. Enter the following parameters:

myswitch::configuration module traffic d> efci <module> (on | off) <number of cells>

Parameter	Description
module	The network module on which the EFCI threshold will be set.
on   off <sup>1</sup>	on means the EFCI bit will be set when the threshold number is reached, signalling congestion. off means the EFCI bit will be cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the cells will have the EFCI bit set. This number must be entered in increments of 32. The default for the on threshold is 256. The default for the off threshold is 192.

<sup>1.</sup> The value for the off threshold must always be less than or equal to the value for the on threshold.

#### 1.12.5.8.5 Displaying Traffic Models for a Series D Network Module

This command allows you to display the different types of traffic memory models on a Series D network module. Enter the following parameters:

 $\verb|myswitch|::configuration module traffic d> \verb|models||\\$ 

	Cell	Table								
Model	Memory	Memory	Ucasts	Mcasts	MOuts	Cells	Counters	Name		
1	256Kx32	256Kx32	12288	1024	4096	16352	8	16K c	cells	OC-12
2	256Kx32	256Kx32	12288	1024	4096	16352	8	16K c	cells	OC-3
3	256Kx32	256Kx32	10240	512	4096	16352	8	16K c	cells	DSn/En
4	512Kx32	256Kx32	12288	1024	4096	32736	8	32K c	cells	OC-12
5	512Kx32	256Kx32	12288	1024	4096	32736	8	32K c	cells	OC-3
6	512Kx32	256Kx32	10240	512	4096	32736	8	32K c	cells	DSn/En

The fields in this display are defined as follows:

Field	Description
Model <sup>1</sup>	The shared memory model for this configuration. This is the number to enter for the <model> parameter when using the conf module traffic d setmodel command.</model>
Cell Memory <sup>2</sup>	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Table Memory	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Ucasts	The maximum number of unicast connections supported by this shared memory configuration.
Mcasts	The number of input multicast connections supported from the switch fabric to the network module by this shared memory configuration.
MOuts	The number of output multicast connections supported from the network module to the link for this shared memory model. Any multicast connection can have multiple outputs on the same network module or the same port. If one multicast connection has four outputs, it requires 1 mcast and 4 mouts.
Cells	The total amount of cell buffering that is supported by this shared memory configuration.
Counters <sup>3</sup>	The number of per-connection counters that is supported by this shared memory configuration. The counters are: 1 - Transmit (CLP=0) counter, 2 - Transmit (CLP=1) counter, 3 - EPD counter, 4 - Unintentional cell loss counter, 5 - CLP=1 threshold counter, 6 - CLP=0+1 threshold counter, 7 - Intentional PPD counter, and 8 - Transmit packet counter.
Name	The identifier for this shared memory model.

<sup>1.</sup> The following Series D network modules can only use the following traffic memory models: OC-12 network modules can only use model 4; OC-3 network modules can only use model 5; and DS3, E3, DS1, and E1 network modules can only use model 6. Models 1, 2, and 3 are not used.

<sup>2.</sup> The Cell and Table Memory sizes determine which memory models are appropriate for a given network module.

<sup>3.</sup> If the module packet counter is enabled under conf module traffic d aal5pktcount, the Transmit CLP=0 and CLP=1 counters are combined into a single Transmit CLP0+1 count.

#### 1.12.5.8.6 Setting Traffic Models on a Series D Network Module

This command lets you select one of the traffic memory models on a Series D network module. Enter the following parameters:

myswitch::configuration module traffic d> setmodel <module> <model>

#### These parameters are defined as follows:

Parameter	Description
module <sup>1</sup>	The network module to be configured.
$\mathrm{model}^2$	The predefined memory model to be used for this Series D network module. The various models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections, and the number of per-connection counters. Enter the number found in the Model field of the conf module traffic d models AMI command for the shared memory configuration that you want to use.

<sup>1.</sup> The following Series D network modules can only use the following traffic memory models: OC-12 network modules can only use model 4; OC-3 network modules can only use model 5; and DS3, E3, DS1, and E1 network modules can only use model 6. Models 1, 2, and 3 are not used.

<sup>&</sup>lt;sup>2.</sup> The network module must be reset for this command to take effect.



Since there is currently only one valid model for each type of network module, the software will not allow you to change the memory model for a Series D network module.

# 1.12.5.8.7 Displaying Traffic on a Series D Network Module

This command lets you display traffic model information about the Series D network modules. Enter the following parameters:

myswitch::configuration module traffic d> show

	Cell			UBR	EFCI	EFCI	AAL5	AltVC	Thresholds
Module	Memory	Model	EPD	EPD	On	Off	PktCnt	CLP0+1	CLP1
1A	256Kx32	2	14717	14717	256	192	disable	4080	256
1B	256Kx32	1	14717	14717	256	192	disable	4080	256
1C	256Kx32	3	14717	14717	256	192	disable	4080	256
1D	256Kx32	3	14717	14717	256	192	disable	4080	256

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Cell Memory	The size of this shared memory cell RAM configuration (x32).
Model	The shared memory model used for this network module. See conf module traffic d models for more information.
EPD	The AAL5 packet drop threshold for CBR, VBR, and ABR traffic on this network module, in cells.
UBR EPD	The AAL5 packet drop threshold for UBR traffic on this network module, in cells.
EFCI On	The threshold value at which the EFCI bit will be set (turned on), signalling congestion, for all traffic, in cells.
EFCI Off	The threshold value at which the EFCI bit will be cleared (turned off), indicating no congestion for all traffic, in cells.
AAL5 PktCnt	enable means the network module counts the number of transmitted AAL5 PDUs. disable means the network module does not count the number of transmitted AAL5 PDUs. The default is disable.
AltVC Threshold CLP0+1	The alternate threshold at which cells are dropped, regardless of their CLP bit, when the current cell count for a connection is greater than this threshold. This threshold is used instead of the VC CLP0+1 threshold if the conf port traffic daltclpconfig command is applied or if it is enabled using the -AltCLP option under conf upc new.
AltVC Threshold CLP1	The alternate threshold at which cells that are CLP=1 are dropped when the current cell count for a connection is greater than this threshold. This threshold is used instead of the VC CLP1 threshold if the conf port traffic daltclpconfig command is applied or if it is enabled using the -AltCLP option under conf upc new.

You can also display traffic model information about an individual Series D network module. Enter the following parameters:

The fields in this display are defined in the same manner as those listed previously.

You can also display traffic information about the Series D network modules on a per-class basis. Enter the following parameters:

myswitch	::configur	ation m	odule	traffic	d>	show	[ <module>]</module>	[perclass]
myswitch	::configur	ation m	odule	traffic	d>	show	perclass	
		VC Thr	esholo	ds				
Module	Priority	CLP0+1		CLP1				
1A	CBR	3072	2	2048				
1A	VBR	3072	2	2048				
1A	UBR	3072	2	2048				
1A	ABR	3072	2	2048				
1B	CBR	3072	2	2048				
1B	VBR	3072	2	2048				
1B	UBR	3072	2	2048				
1B	ABR	3072	2	2048				
1C	CBR	3072	2	2048				
1C	VBR	3072	2	2048				
1C	UBR	3072	2	2048				
1C	ABR	3072	2	2048				
1D	CBR	3072	2	2048				
1D	VBR	3072	2	2048				
1D	UBR	3072	2	2048				
1D	ABR	3072	. 2	2048				

### The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Priority	The class of service to which these thresholds apply.
VC Thresholds CLP0+1	The threshold at which cells are dropped, regardless of their CLP bit, when the current cell count for a connection is greater than this threshold for this traffic type.
VC Thresholds CLP1	The threshold at which cells that are CLP=1 are dropped when the current cell count for a connection is greater than this threshold for this traffic type.

If no Series D network modules are installed, then the following is displayed:

```
myswitch::configuration module traffic d> show
No Series-D traffic information is available
```

#### 1.12.5.8.8 Configuring the VC CLP Threshold on a Series D Network Module

This command lets you configure the per-connection CLP threshold for all VCs on a per-class basis. Enter the following parameters:

```
myswitch::configuration module traffic d> vcclpthresh <module> (cbr | vbr | abr | ubr)
(clp1 | clp01) <threshold>
```

#### These parameters are defined as follows:

Parameter	Description
module	The network module to be configured.
cbr   vbr   abr   ubr	The class of service for which this threshold applies.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for a connection is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the CLP=0+1 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for a connection is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the CLP=1 threshold.
threshold	The number of cells in the buffer at which the specified traffic type drops CLP=1 or CLP=0+1 cells. This threshold can only be adjusted in increments of multiples of 16 cells (e.g., 16, 32, 48). For CLP=1, the minimum value is 0, the maximum is the CLP=0+1 threshold - 16 cells, and the default is 256 cells. For CLP=0+1, the minimum value is the CLP=1 threshold + 16 cells, the maximum is 4,080 cells, and the default is 4,080 cells.

# 1.13 NSAP Configuration Commands

These commands allow you to configure NSAP prefixes; to display ILMI registered NSAP addresses; to configure NSAP-to-E.164 address mappings; and to configure a table of LECS addresses that switches can query when attached LECs ask for the registered LECS address. To list the available commands, type ? at the nsap level.

```
myswitch::configuration nsap> ?
  prefix> ilmi> e164> registry>
```

# 1.13.1 NSAP Prefix Configuration Commands

These commands enable you to delete an NSAP prefix, create an NSAP prefix, and display NSAP prefix information. You can display the list of available subcommands by typing? at the prefix level.

### 1.13.1.1 Deleting an NSAP Prefix

This command lets you remove an existing NSAP prefix. Enter the following parameters:

```
myswitch::configuration nsap prefix> delete <port> <vpi> <prefix>
```

# 1.13.1.2 Creating an NSAP Prefix

This command lets you create an NSAP prefix. Enter the following parameters:

```
myswitch::configuration nsap prefix> new <port> <vpi> <prefix>
```

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number for this NSAP prefix.
vpi	The virtual path number for this NSAP prefix.
prefix <sup>1</sup>	The NSAP prefix for this entry.

<sup>1.</sup> Because multiple prefixes are not supported on the same port, delete the old prefix before creating a new one.

### 1.13.1.3 Displaying NSAP Prefixes

This command enables you to display the current list of NSAP prefixes. Enter the following parameters:

The fields in this display are defined as follows:

Field	Description					
Port	The port number for this NSAP prefix.					
VPI	The virtual path number on which this NSAP prefix exists.					
NSAP-Prefix	The NSAP prefix for this entry.					

You can also display information about an individual port; or port and vpi; or port, vpi, and prefix as follows:

```
myswitch::configuration nsap prefix> show [<port> [<vpi> [<prefix>]]]
myswitch::configuration nsap prefix> show lal
Port.
         VPI NSAP-Prefix
1A1
            0 0x47.0005.80.ffe100.0000.f124.00de
myswitch::configuration nsap prefix> show lal 0
Port
         VPI NSAP-Prefix
1A1
            0 0x47.0005.80.ffe100.0000.f124.00de
myswitch::configuration nsap prefix> show lal 0
0x47.0005.80.ffe100.0000.f124.00de
Port.
         VPI NSAP-Prefix
            0 0x47.0005.80.ffe100.0000.f124.00de
1A1
```

The fields in these displays are defined in the same manner as those listed previously.

If you have not configured any NSAP prefixes, then the following message is displayed:

```
myswitch::configuration nsap prefix> show
No user configured NSAP prefix information is available
```

# 1.13.2 NSAP ILMI Configuration Command

This command lets you display the NSAP addresses of all of the ports on a switch fabric that have been registered via ILMI. ILMI address registration occurs between the switch and host. The switch sends the host its 13-byte NSAP prefix. If the host accepts the prefix, the host builds its own NSAP address by appending its 7-byte host specific part. The host returns the complete 20-byte NSAP address to the switch. If the switch accepts it, the switch enters that information into its topology tables and all connections destined for that NSAP address are routed to that host. These registration messages are sent over the reserved channel VPI 0, VCI 16. You can display the available subcommand by typing ilmi? at the nsap level.

```
myswitch::configuration nsap> ilmi ?
show
```

# 1.13.2.1 Displaying NSAP Addresses Registered through ILMI

This command lets you display the NSAP addresses of all of the ports on a switch fabric that have been registered via ILMI. Enter the following parameters:

```
myswitch::configuration nsap ilmi> show
Port NsapAddress
1C1 47000580ffe1000000f21a116f00204810308600
```

The fields in this display are defined as follows:

Field	Description
Port	The port number on which an NSAP address has been registered via ILMI.
NSAPAddress	The NSAP address that has been registered through ILMI for this port.

To display the NSAP addresses that have been registered via ILMI for a specific port, enter the following parameters:

```
myswitch::configuration nsap ilmi> show [<port>]
myswitch::configuration nsap ilmi> show 1C1
Port NsapAddress
1C1 47000580ffe1000000f21a116f00204810046400
```

If no addresses have been registered via ILMI, the following is displayed:

```
No NSAP address information is available
```

# 1.13.3 NSAP-to-E.164 Configuration Commands

These commands let you display NSAP-to-E.164 address mapping information, create an NSAP-to-E.164 address mapping, and delete an NSAP-to-E.164 address mapping. You can display the list of available subcommands by typing e164? at the nsap level.

### 1.13.3.1 Displaying NSAP-to-E.164 Address Mapping Information

This command enables you to display the current NSAP-to-E.164 address mapping information. Enter the following parameters:

The fields in this display are defined as follows:

Field	Description
Port	The port number on which the NSAP-to-E.164 address mapping exists
VPI	The virtual path number on which the NSAP-to-E.164 address mapping is to be created.
NSAP-Address	The NSAP address for this mapping.
Mask	The number of leading significant bits for this NSAP address.
Native-E164Address	The E.164 address, which can be up to 15 ASCII digits (0-9) long.

If no NSAP-to-E.164 mapping information has been configured, you receive the following message:

```
myswitch::configuration nsap> e164 show
No NSAP <-> E.164 Mapping information is available.
```

### 1.13.3.2 Adding an NSAP-to-E.164 Address Mapping

This command lets you map an NSAP address to an E.164 address format. Enter the following parameters:

```
myswitch::configuration nsap e164> new <port> <vpi> <NSAP> <mask> <E.164>
```

The following is an example of how to add an NSAP-to-E.164 mapping to the mapping table:

```
myswitch::configuration nsap e164> new 3b2 0
0x47.0005.80.ffe100.0000.f21a.00d0.0020481a00d0.0b 152 4126352756
```

# 1.13.3.3 Deleting an NSAP-to-E.164 Address Mapping

This command lets you remove an existing NSAP-to-E.164 address mapping. Enter the following parameters:

```
myswitch::configuration nsap e164> delete <port> <vpi> <NSAP> <mask>
```

The following is an example of how to delete an NSAP-to-E.164 mapping from the mapping table:

myswitch::configuration nsap e164> del 3B2 0 47000580ffe1000000f21a00d00020481a00d000 152

The parameters for new and delete are defined as follows:

Parameter	Description
port	The port number for this NSAP-to-E.164 address mapping.
vpi	The virtual path number for this NSAP-to-E.164 address mapping.
NSAP	The NSAP address for this entry.
mask	The number of leading significant bits for this NSAP address.
E.164	The E.164 address, which can be up to 15 ASCII characters long.

# 1.13.4 ILMI LECS Address Registry Commands

These commands let you configure a table of LECS addresses per port. The LAN Emulation Client (LEC) on the user side of the ATM UNI port uses ILMI to query the attached switch for the registered LECS address. You can display the list of available subcommands by typing? at the registry level.

# 1.13.4.1 Displaying the ILMI LECS Address Registry

This command lets you display the contents of the ILMI LECS address registry. Enter the following parameters:

The fields in this display are defined as follows:

Field	Description
Port	The port number for the interface. An $^{\ast}$ to the left of the port number means that entry is still being created and is not active yet.
Туре	This is a read-only field that indicates the type of service that is available at the given NSAP address.
Instance	A user-configurable index number that distinguishes between addresses when multiple LECS addresses are assigned to the same port.
Nsap-Address	The LECS address assigned to this port.

If no entries have been configured in the registry, then the following is displayed:

```
myswitch::configuration nsap registry> show
No information is available
```

### 1.13.4.2 Deleting an ILMI LECS Address Registry Entry

This command lets you delete an entry or multiple entries from the ILMI LECS address registry. Enter the following parameters:

```
myswitch::configuration nsap registry> delete lecs <port> <instance>
```

For example, you can delete a specific instance on a specific port as follows:

```
myswitch::configuration nsap registry> delete lecs 1A2 2
```

This example only deletes instance number 2 from port 1A2.

You can also delete a specific instance on the control port (CTL) as follows:

```
myswitch::configuration nsap registry> new lecs 1CTL 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example only delete instance number 1 from port 1CTL. (On an ASX-1000 or a TNX-1100, you need to specify the board number; e.g., 2CTL.)

You can also use an asterisk (\*) as a wildcard character to delete all registered addresses on a switch fabric that have the same instance number as follows:

```
myswitch::configuration nsap registry> delete lecs * 2

Are you sure you want to delete *ALL* LECS entries with 2 as the instance [n]? y
```

If you type n or press <ENTER>, the command is aborted. If you type y, all registered addresses on that switch fabric with the instance number 2 are deleted.

Additionally, you can use an asterisk (\*) as a wildcard character to delete registered addresses from all ports on a specific network module. The wildcard character does not apply to the CTL port. Enter the \* in the network module portion of the port number as follows:

```
myswitch::configuration nsap registry> delete lecs C* 1
```

This example deletes all registered addresses on all ports on network module C with instance number 1.

# 1.13.4.3 Adding an ILMI LECS Address Registry Entry

This command lets you add an entry or multiple entries to the ILMI LECS address registry. A maximum of 4 entries may be configured on each port. Enter the following parameters:

myswitch::configuration nsap registry> new lecs <port> <instance> <nsap-address>



If the switch port you specify is already configured with an ATM address with the same instance that you specify, the command fails.

For example, you can create a specific instance on a specific port as follows:

```
myswitch::configuration nsap registry> new lecs 1A1 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example only creates instance number 1 on port 1A1.

You can also create a specific instance on the control port (CTL) as follows:

```
myswitch::configuration nsap registry> new lecs 1CTL 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example only creates instance number 1 on port 1CTL. (On an ASX-1000 or a TNX-1100, you need to specify the board number; e.g., 2CTL.)

You can also use an asterisk (\*) as a wildcard character for the port number to register the same LECS address on all existing ports on a switch fabric as follows:

```
myswitch::configuration nsap registry> new lecs * 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example creates instance number 1 with the specified address on all existing ports in switch fabric 1.

#### AMI Configuration Commands

Additionally, you can use an asterisk (\*) as a wildcard character to register the same LECS address on all ports on a specific network module. The wildcard character does not apply to the CTL port. Enter the \* in the network module portion of the port number as follows:

```
myswitch::configuration nsap registry> new lecs B* 1
47000580ffe1000000f21a00d00020481b78210a
```

This example registers the specified address as instance 1 on all ports on network module B.

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number for this ILMI LECS address registry entry.
instance	A user-configurable index number that distinguishes between the LECS addresses when multiple LECS addresses are assigned to the same port. This number can be from 1 to 4.
nsap-address	The NSAP address of the LECS for this entry.

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